Hardware Installation Guide for Cisco 8400 Series Secure Routers

Cisco 8400 Series Secure Routers
Updated July 25, 2025

1 Introduction to Cisco 8400 Series Secure Routers

Topics:

- Cisco 8400 Series Secure Routers
- Ethernet ports on C8475-G2 Secure Router
- Ethernet ports on C8455-G2 Secure Router
- Chassis views for C8475-G2 Secure Router
- Chassis views for C8455-G2 Secure Router
- Chassis ventilation
- Locate labels

Cisco 8400 Series Secure Routers

Introduces the Cisco 8400 Series Secure Routers, detailing hardware features, supported transceivers, and power supply specifications for comprehensive understanding of platform capabilities.

The Cisco 8400 Series Secure Routers are optimized for campus edge deployments. These routers are powered by a secure networking processor to accelerate encryption and threat protection throughput.

This document covers hardware installation-specific details only for the following routers:

- C8475-G2
- C8455-G2

For more information on the features and specifications, refer to the Cisco 8400 Series Secure Routers datasheet.

Features

This section describes the hardware features of the Cisco C8400 Series Secure Routers.

Table 1: Different features of Cisco C8400 Series Secure Routers

Feature	C8455-G2	C8475-G2
Ethernet Ports	8x 1GE SFP 2x 10GE SFP+ 2x 25GE SFP28	8x 1GE SFP 8x 10GE SFP+ 4x 25GE SFP28
Rack Unit	1RU	1RU
System Memory (DRAM)	32GB DRAM	Default: 32GB DRAM Upgrade option: 64GB DRAM **Note** The upgrade option is supported from the Release 17.18.3a.
Storage	Default: 32GB M.2 USB Upgrade Options: 600GB, 2TB M.2 SSD	Default: 32GB M.2 USB Upgrade Options: 600GB, 2TB M.2 SSD
Boot Flash Storage	32GB	32GB
Management Interface	1x RJ45 10/100/1000 Mbps	1x RJ45 10/100/1000 Mbps
ConsolePort	1x RJ45 1x USB Micro-USB (Type B)	1x RJ45 1x USB Micro-USB (Type B)
USB Ports	1x USB 3.0 Type-C	1x USB 3.0 Type-C

Feature	C8455-G2	C8475-G2
Rack Installation	19 inch or 23 inch rack mount	19 inch or 23 inch rack four-post rack mount

Supported transceivers

- **1GE SFP ports**: Supports multi-rate up to 1GE interface. Auto-negotiation is supported.
- **10GE SFP+ ports**: Supports dual-rate 1GE or 10GE interface. Auto-negotiation is not supported.
- **25GE SFP28 ports**: Supports dual-rate 10GE or 25GE interface. Auto-negotiation is not supported.

Power supply

The Cisco 8400 Series Secure Routers have dual PSU slots and includes redundant PSUs by default.

This table lists the supported power supply PIDs for the different input types:

Table 2: Power supplies and PIDs

Input-type	Input	C8455-G2	C8475-G2
AC	100 to 240 VAC	PWR-CH1-250WAC	PWR-CH1-400WAC
DC	+48 to +60 VDC -48 to -60 VDC	PWR-CH1-400WDC	PWR-CH1-400WDC
HVDC	85 to 305 VAC 192 to 400 VDC	PWR-CC1-400WHV	PWR-CC1-400WHV

Note

The Cisco 8400 Series Secure Routers can support two AC, DC, or High Voltage AC or DC (HVDC) power supplies. Do not install mixed AC and DC power supply units in the same chassis.

Table 3: DC power supply requirements

System Input Rating (Amps)	Circuit BreakerAmps		AWG # Wire
	Minimum	Maximum	
15A	20	30	14

Ethernet ports on C8475-G2 Secure Router

Explains the Ethernet port configurations for Cisco C8475-G2 Router, focusing on GE and SFP port details to support network connectivity requirements.

GE and SFP ports

Management ethernet port

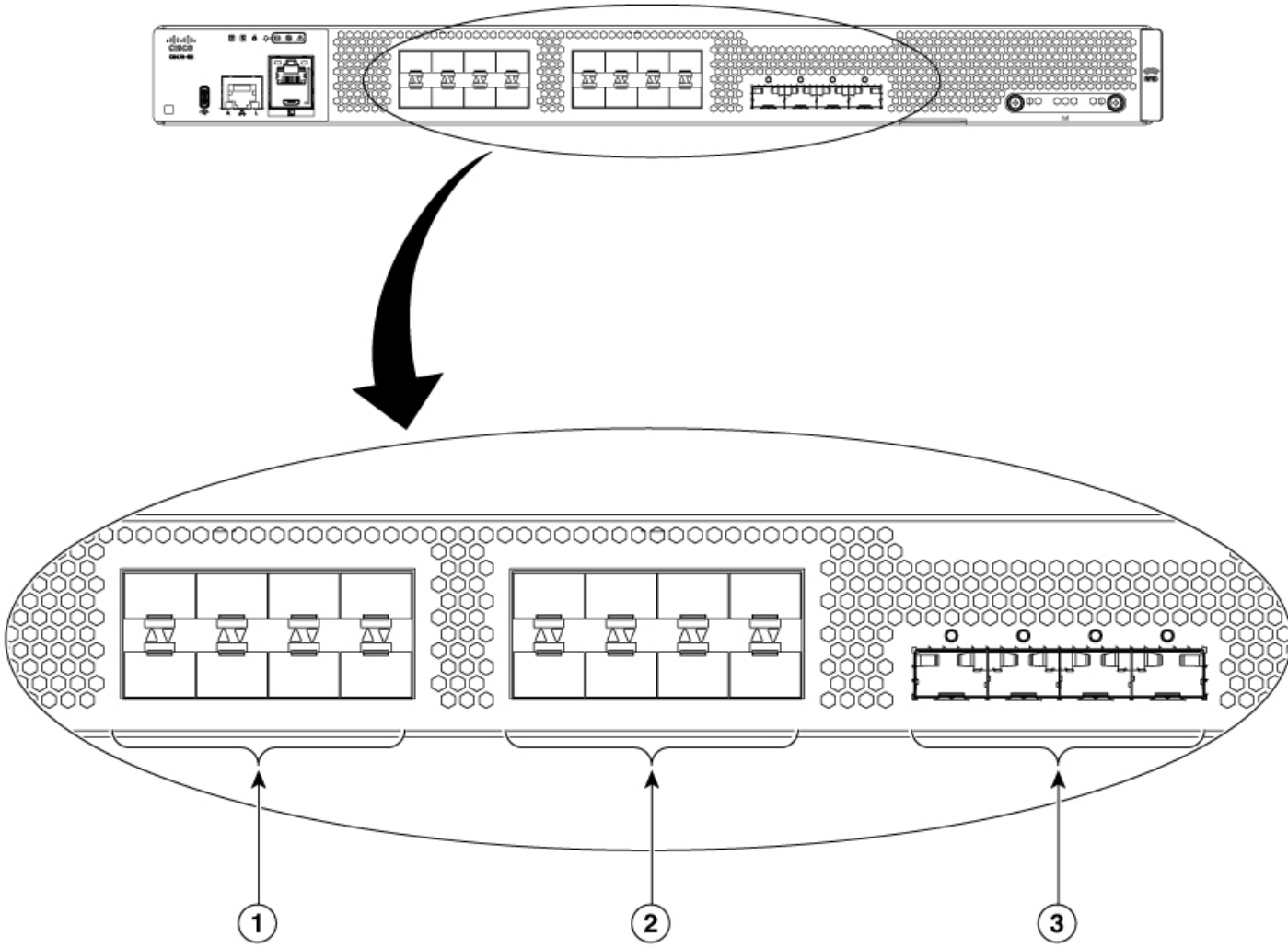
The C8475-G2 router has one gigabit ethernet management ethernet interface that supports 10/100/1000 Mbps speed. The purpose of this interface is to allow users to perform management tasks on the router, often through Telnet and SSH. It is not designed to forward network traffic.

SFP ports

The C8475-G2 router has SFP, SFP+, and SFP28 ports.

- Bay 0 (0/0/0 - 0/0/7) ports support SFP transceivers with maximum 1 Gbps speed.
- Bay 0 (0/0/9 - 0/0/15) ports support SFP or SFP+ transceivers with 1 Gbps and 10 Gbps speeds, respectively.
- Bay 0 (0/0/16 - 0/0/19) ports support SFP+ or SFP28 transceivers, with 10 Gbps and 25 Gbps speeds, respectively.

Figure 1: GE and SFP ports



1	8X 1GE SFP Ports (0/0/0 - 0/0/7)
2	8X 1/10G SFP Ports (0/0/9 - 0/0/15)

3	4X 10/25G SFP Ports (0/0/16 - 0/0/19)

Ethernet ports on C8455-G2 Secure Router

Describes Ethernet port options on the C8455-G2 Edge Router, highlighting GE and SFP port functionalities for optimal edge networking solutions.

The C8455-G2 Secure Router has these ports:

GE and SFP ports

Management ethernet port

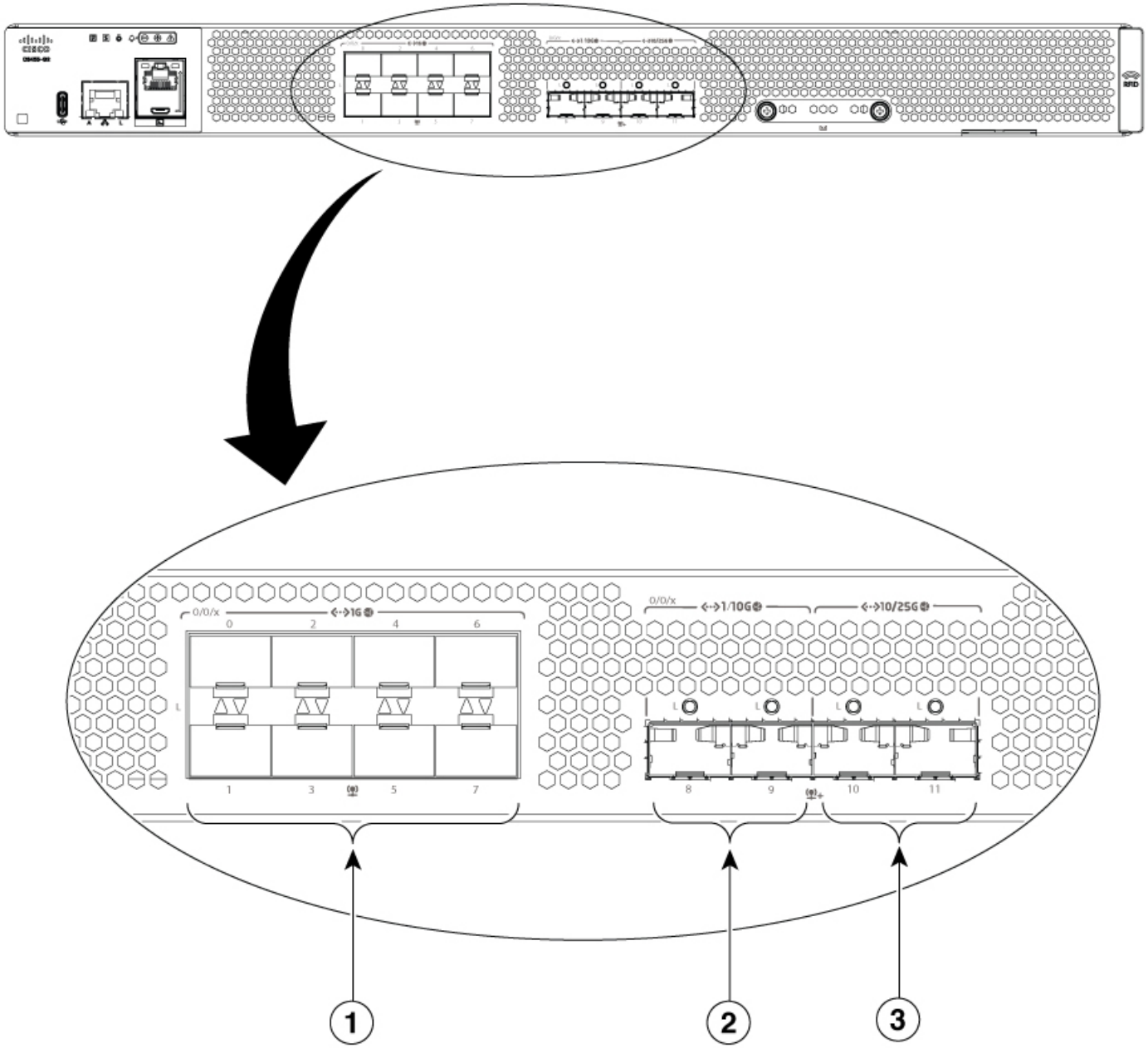
The C8455-G2 router has one Gigabit Ethernet management ethernet interface. The purpose of this interface is to allow users to perform management tasks on the router, often through Telnet andSSH. It is not designed to forward network traffic. The Gigabit Ethernet management ethernet interface supports 10/100/1000 Mbps speed.

SFP ports

The C8455-G2 router has SFP, SFP+, and SFP28 ports.

- Bay 0 (0/0/0 - 0/0/7) ports support SFP transceivers with maximum 1Gbps speed.
- Bay 0 (0/0/8 - 0/0/9) ports support SFP or SFP+ transceivers with 1Gbps and 10Gbps speeds, respectively.
- Bay 0 (0/0/10 - 0/0/11) ports support SFP+ or SFP28 transceivers with 10Gbps and 25Gbps speeds, respectively.

Figure 2: GE and SFP ports



1	8X 1GE SFP Ports (0/0/0-0/0/7)
2	2X 1/10G SFP Ports (0/0/8-0/0/9)
3	2X 10/25G SFP Ports (0/0/10-0/0/11)

Chassis views for C8475-G2 Secure Router

Outlines chassis perspectives for the C8455-G2 Router, detailing router LEDs and offering a summary of the platform for enhanced hardware understanding.

Figure 3: C8475-G2 Chassis - I/O Side

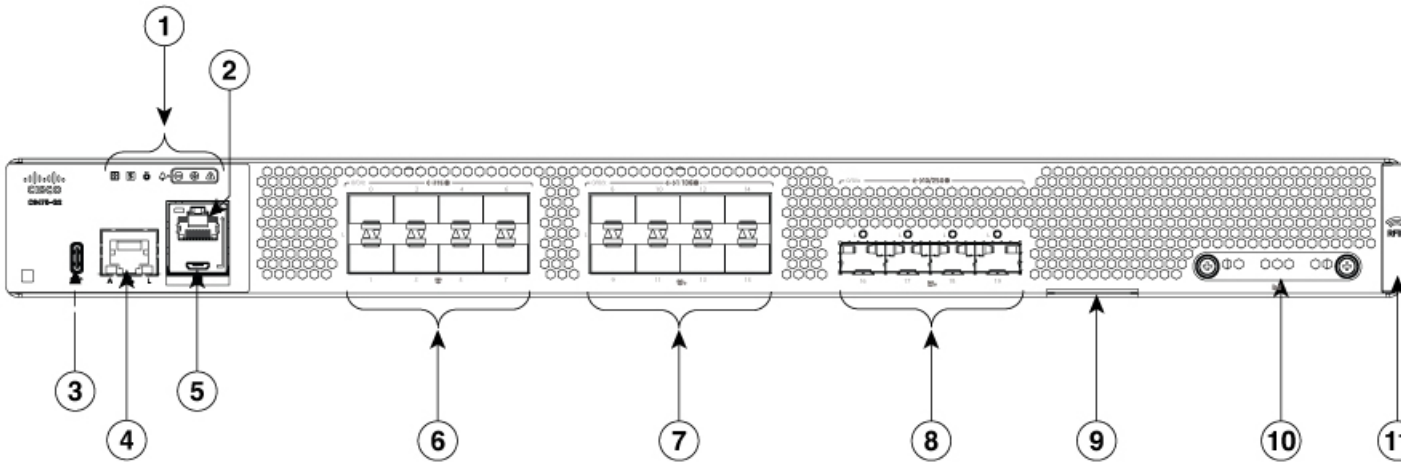


Table 4: I/O Side

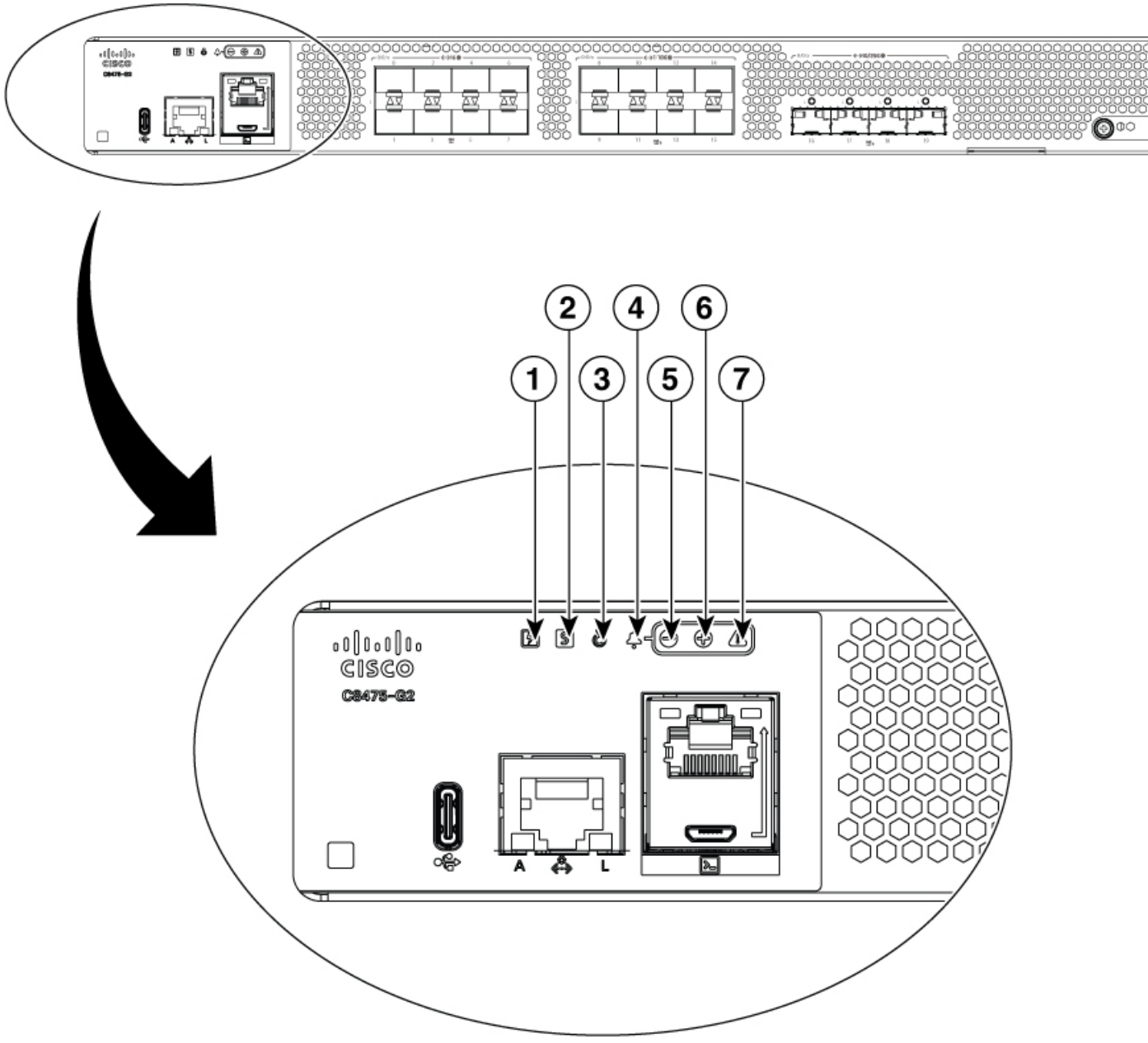
1	Status indicator LEDs
2	RJ45 console port
3	USB port
4	Gigabit Ethernet management port
5	USB console port
6	SFP ports (0/0/0 - 0/0/7)
7	SFP+ ports (0/0/8 - 0/0/15)
8	SFP28 ports (0/0/16 - 0/0/23)
9	Pull-out tray
10	M.2 storage slot

11

LEDs for C8475-G2 Secure Router

LEDs for C8475-G2 Edge Platforms

Figure 4: LEDs for C8475-G2 Secure Router



1	Power
2	Status
3	Blue beacon

4	Alarm icon (not lit)
5	Minor alarm
6	Major alarm
7	Critical alarm

Table 5: LEDs Indicators

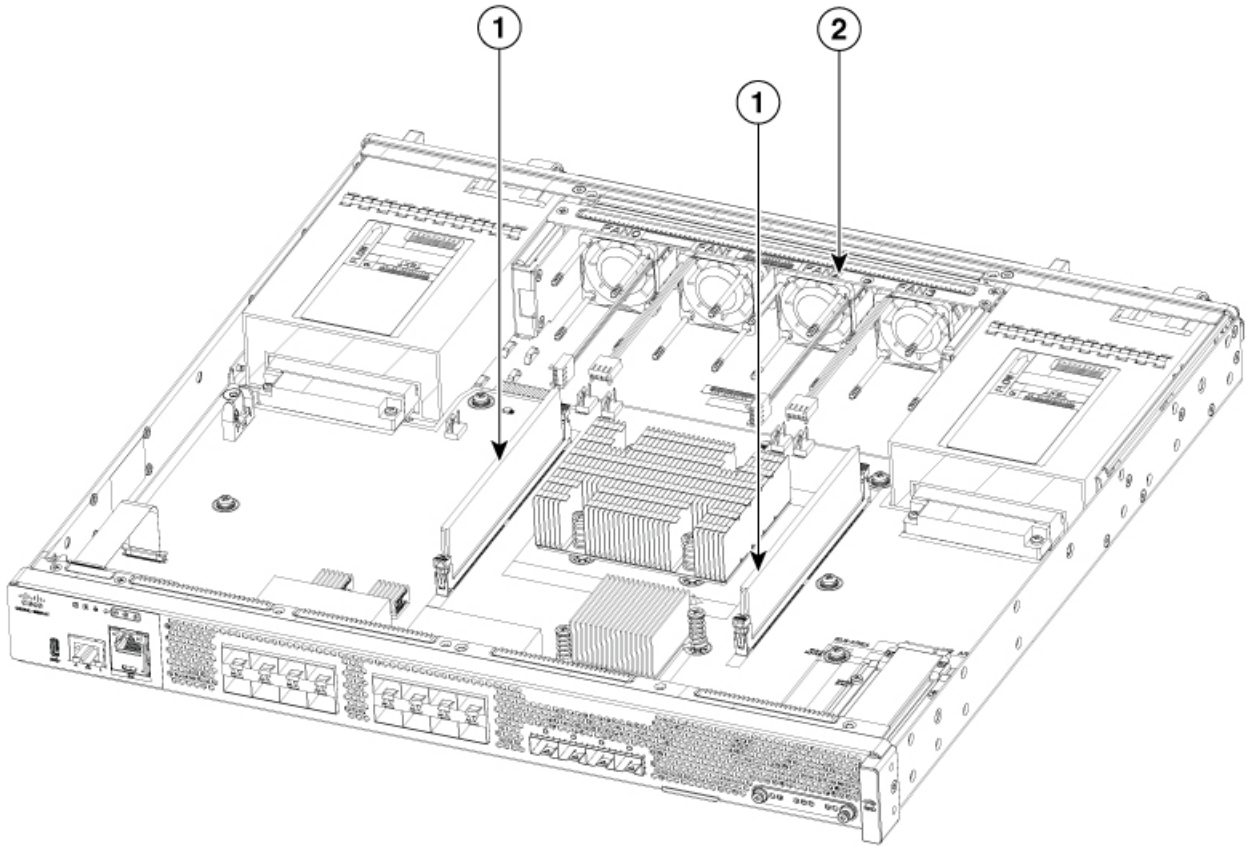
LED	Color	Description
PSU	Green/Amber	**Power Supply Status** Off: The system is powered off. Amber: A power supply has malfunctioned (or is not installed). Green: Both installed power supplies are operating correctly.
Status	Green/Amber/Red	**System Status** Blinking Amber: The system is booting ROMMON. Amber: System is at ROMMON prompt or booting router software. Green: Normal System Operation. Blinking Red: The system has failed a hardware integrity check.
Beacon	Blue	**Beacon LED** Blinking Blue: Beacon requested.
Minor Alarm	Amber	**Minor Alarm** Off: No Minor Alarm. Amber: Minor Alarm Asserted.
Major Alarm	Red	**Major Alarm** Off: No Major Alarm. Red: Major Alarm Asserted.
Critical Alarm	Red	**Critical Alarm** Off: No Critical Alarm. Red: Critical Alarm Asserted.
Link	Green	**RJ-45 Management Ethernet Link LED** Off: No link. Green: Ethernet cable present and link established with other side.

LED	Color	Description
Activity	Green	**RJ-45 Management Ethernet Activity LED** Blinking Green: Ethernet activity detected.
USB con	Green	**USB Console Active** Green: indicates that the active console port is USB. When this is “On” the SER CON LED will be “Off”.
SER con	Green	**Serial Console Active** Green: indicates that the active console port is RJ-45. When this is “On” the USB CON LED will be “Off”.
SFP	Green/Amber	**SFP port 0/1 Link LED** Off: SFP not present or port not configured (i.e., admin down). Amber: Link down / Loss of Signal. Green: Link established.

C8475-G2 summary

The figure below shows the internal view of C8475-G2 router with parts and module locations.

Figure 5: Summary of C8475-G2



1 [illegible]

2 Fan tray

Chassis views for C8455-G2 Secure Router

Outlines chassis perspectives for the C8455-G2 Router, detailing router LEDs and offering a summary of the platform for enhanced hardware understanding.

Figure 6: C8455-G2 Chassis - I/O Side

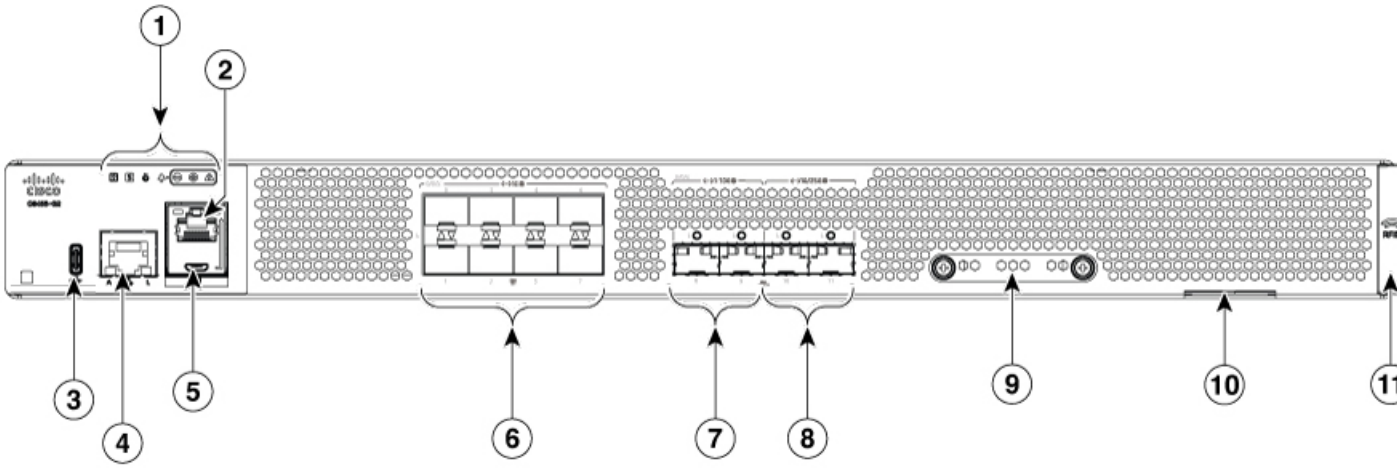


Table 6: I/O Side

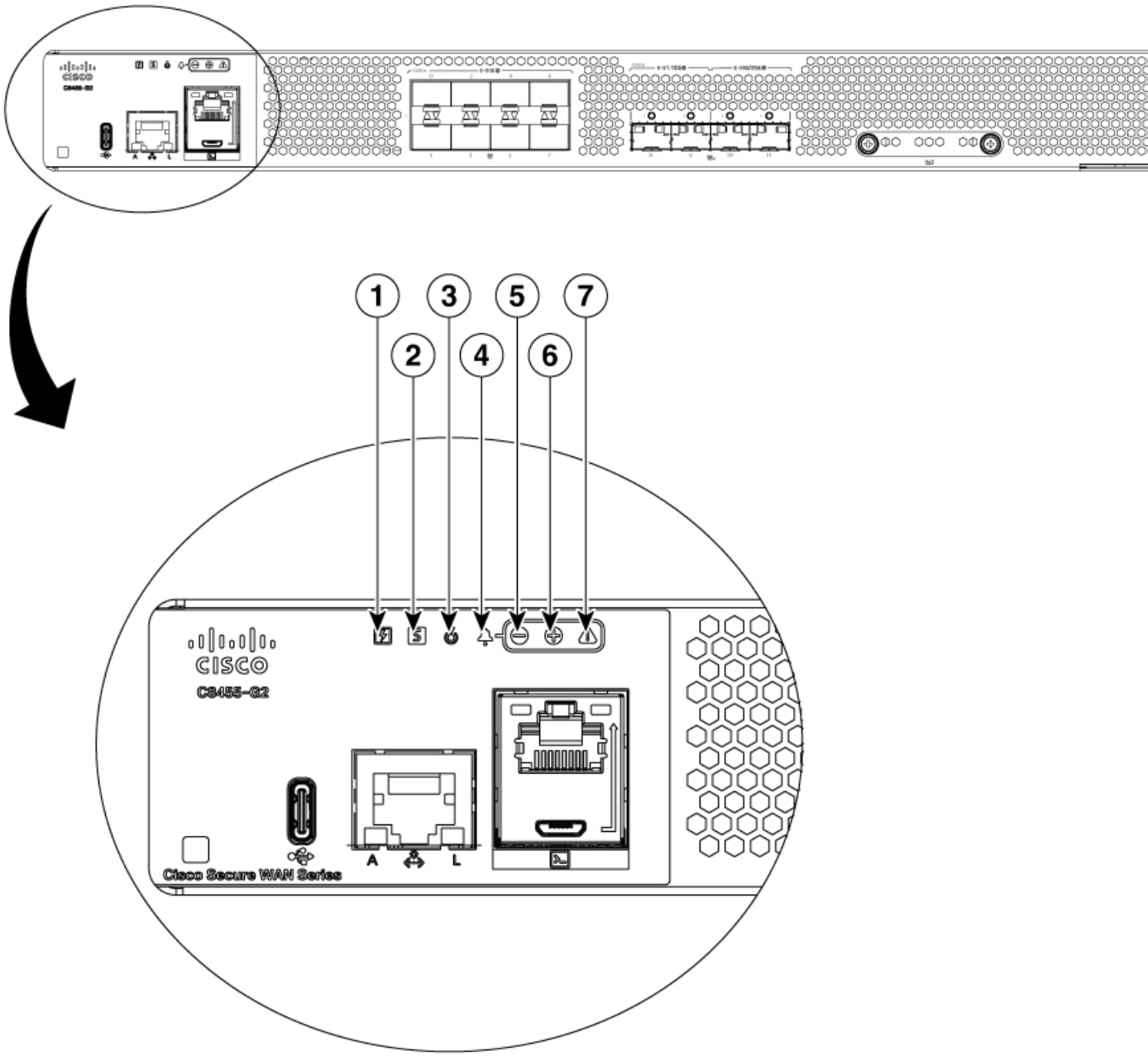
1	Status indicator LEDs
2	RJ45 console port
3	USB type C port
4	Gigabit management port
5	USB console
6	SFP ports (0/0/0 - 0/0/7)
7	SFP+ ports (0/0/8 - 0/0/11)
8	SFP28 ports (0/0/12 - 0/0/15)
9	M.2 NVMe card slot
10	Dedicated tray

11

LEDs for C8455-G2 Secure Router

LEDs for C8455-G2 Secure Router

Figure 7: LEDs for C8455-G2 Secure Router



1	Power
2	Status

3	Blue Beacon
4	Alarm icon (not lit)
5	Minor Alarm
6	Major Alarm
7	Critical Alarm

Table 7: LED indicators

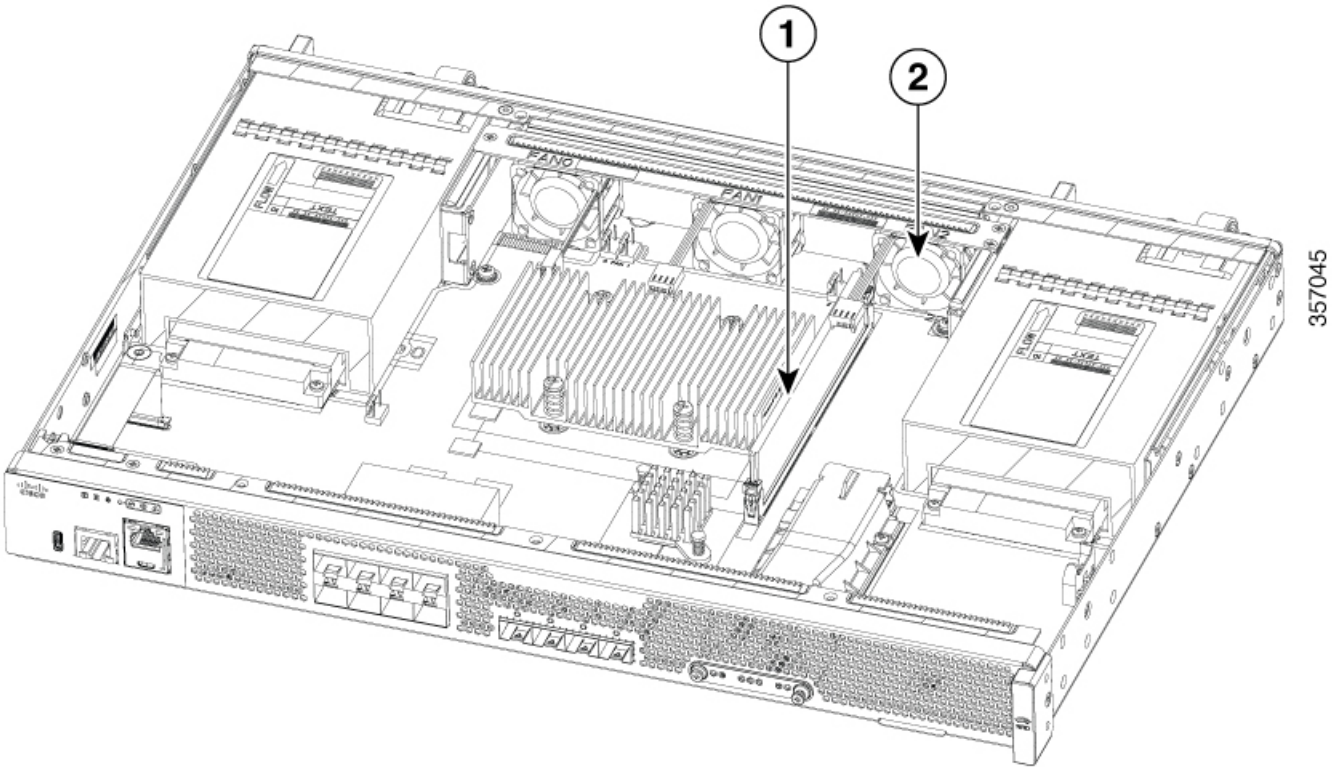
LED	Color	Description
PSU	Green/Amber	**Power Supply Status** Off: The system is powered off. Amber: A power supply has malfunctioned (or is not installed). Green: Both installed power supplies are operating correctly.
STATUS	Green/Amber/Red	**System Status** Blinking Amber: The system is booting ROMMON. Amber: System is at ROMMON prompt or booting platform software. Green: Normal System Operation. Blinking Red: The system has failed a hardware integrity check.
BEACON	Blue	**Beacon LED** Blinking Blue: Beacon requested.
MINOR ALARM	Amber	**Minor Alarm** Off: No Minor Alarm. Amber: Minor Alarm Asserted.
MAJOR ALARM	Red	**Major Alarm** Off: No Major Alarm. Red: Major Alarm Asserted.
CRITICAL ALARM	Red	**Critical Alarm** Off: No Critical Alarm. Red: Critical Alarm Asserted.
LINK	Green	**RJ-45 Management Ethernet Link LED** Off: No link. Green: Ethernet cable present and link established with other side.

LED	Color	Description
ACTIVITY	Green	**RJ-45 Management Ethernet Activity LED** Blinking Green: Ethernet activity detected.
USB CON	Green	**USB Console Active** Green: indicates that the active console port is USB. When this is “On” the SER CON LED will be “Off”.
SER CON	Green	**Serial Console Active** Green: indicates that the active console port is RJ-45. When this is “On” the USB CON LED will be “Off”.
SFP	Green/Amber	**SFP port 0/1 Link LED** Off: SFP not present or port not configured (i.e., admin down). Amber: Link down / Loss of Signal. Green: Link established.

C8455-G2 summary

The figure below shows the internal view of with parts and module locations.

Figure 8: Summary of C8455-G2



1 [illegible]

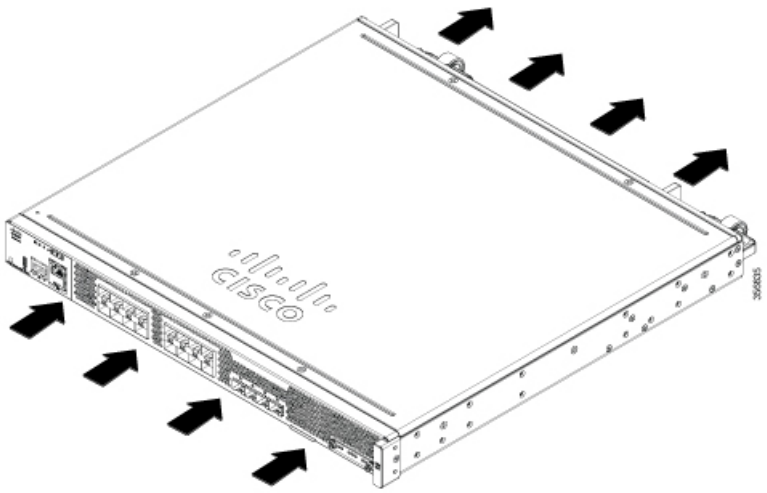
2 Fan tray

Chassis ventilation

Details the chassis ventilation mechanisms for Cisco 8400 Series Secure Routers to ensure effective cooling and reliable device operation.

The chassis temperature is regulated with internal fans. An onboard temperature sensor and pressure sensor controls the fan speed. The fans are always on when the device is powered on. Under all conditions, the fans operate at the slowest speed possible to conserve power and reduce noise. The fans operate at higher speeds under conditions of higher ambient temperature and altitude or under fault conditions like a fan failure. The air intake is on the I/O side.

Figure 9: Airflow of Cisco 8400 Series Secure Routers



Locate labels

Guides users in identifying and locating product labels and identification details on Cisco 8400 Series Secure Routers, supporting asset management and compliance.

Use the Cisco Product Identification (CPI) tool to find labels on the platform. The tool provides detailed illustrations and descriptions of where labels are located on Cisco products. It includes the following features:

- A search option that allows browsing for models by using a tree-structured product hierarchy.
- A search field on the final results page that makes it easier to look up multiple products.
- End-of-sale products clearly identified in results lists.

The tool streamlines the process of locating serial number labels and identifying products. Serial number information expedites the entitlement process and is required for access to support services.

Location of labels on Cisco C8400 Secure Routers

The figures below shows the location of the labels on the Cisco 8400 Series Secure Routers.

The Serial number (SN), Common language equipment identifier (CLEI), Tax deduction and collection account (TAN), Product ID (PID), PID version ID (VID), and Quick response (QR) code are printed at the same location on a label tray located on the chassis on all the Cisco 8400 Secure Routers.

Figure 10: Label location on C8475-G2

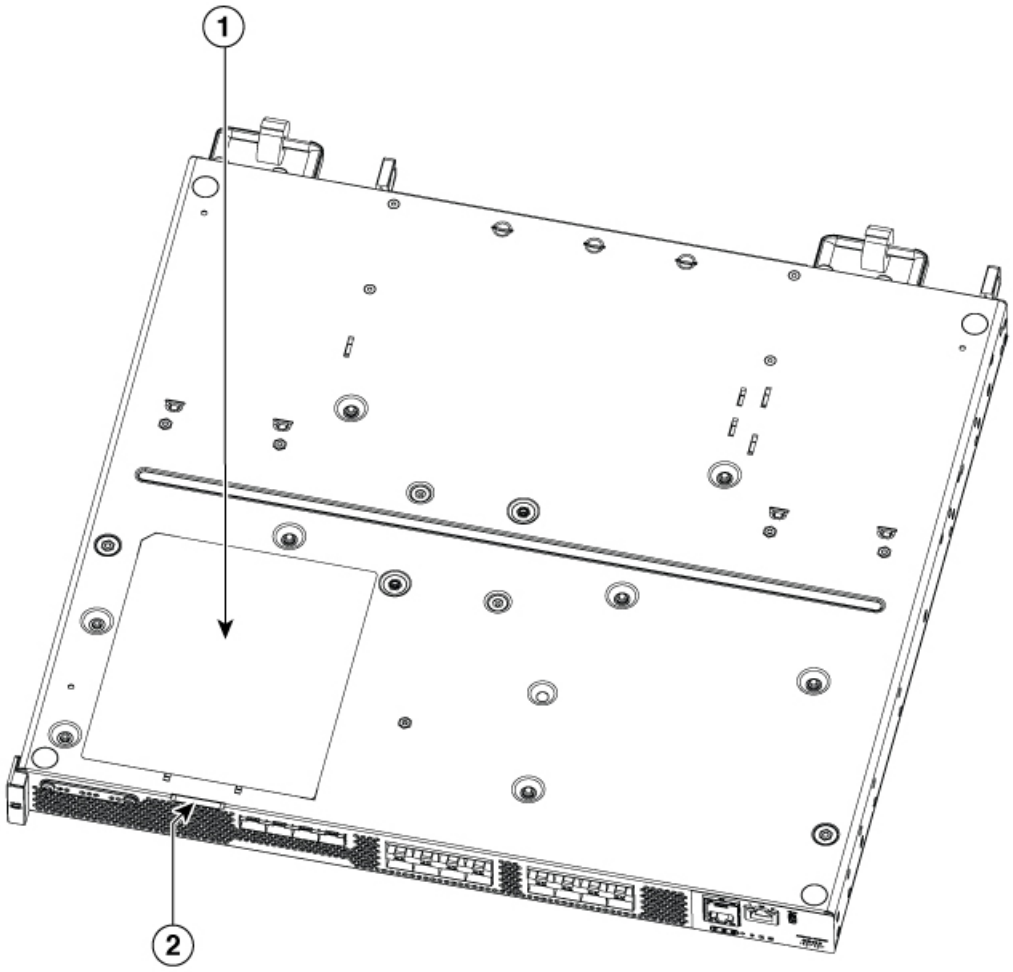
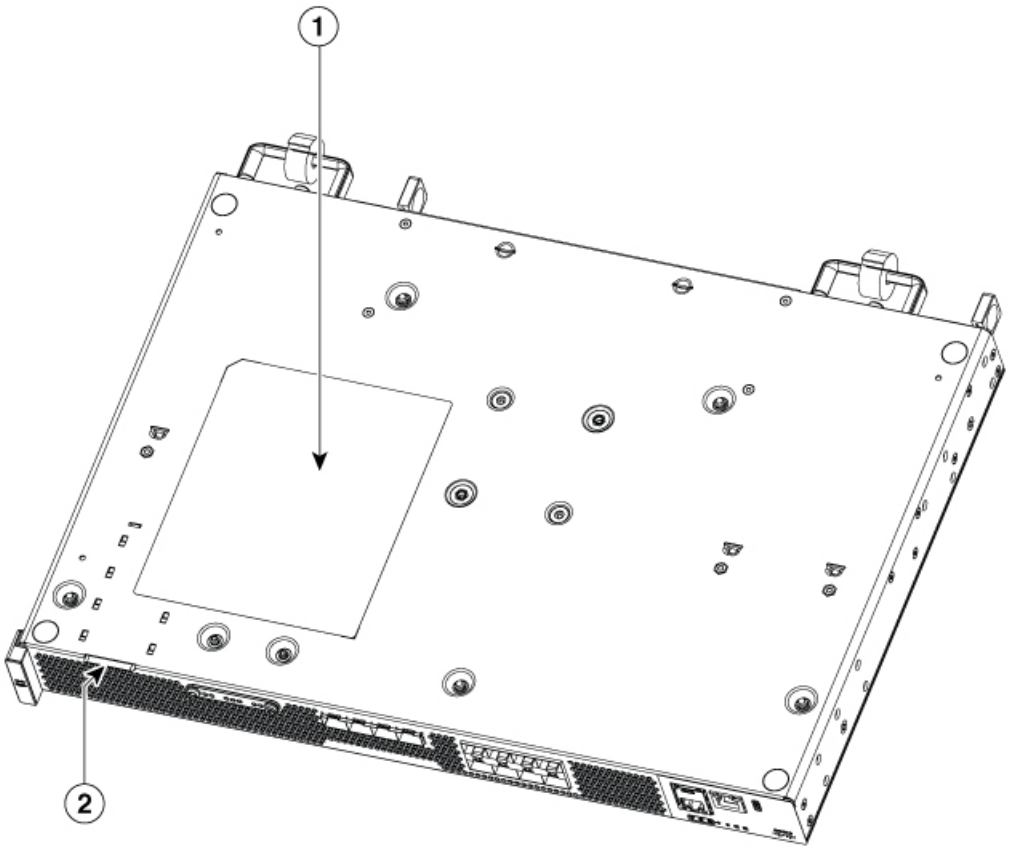
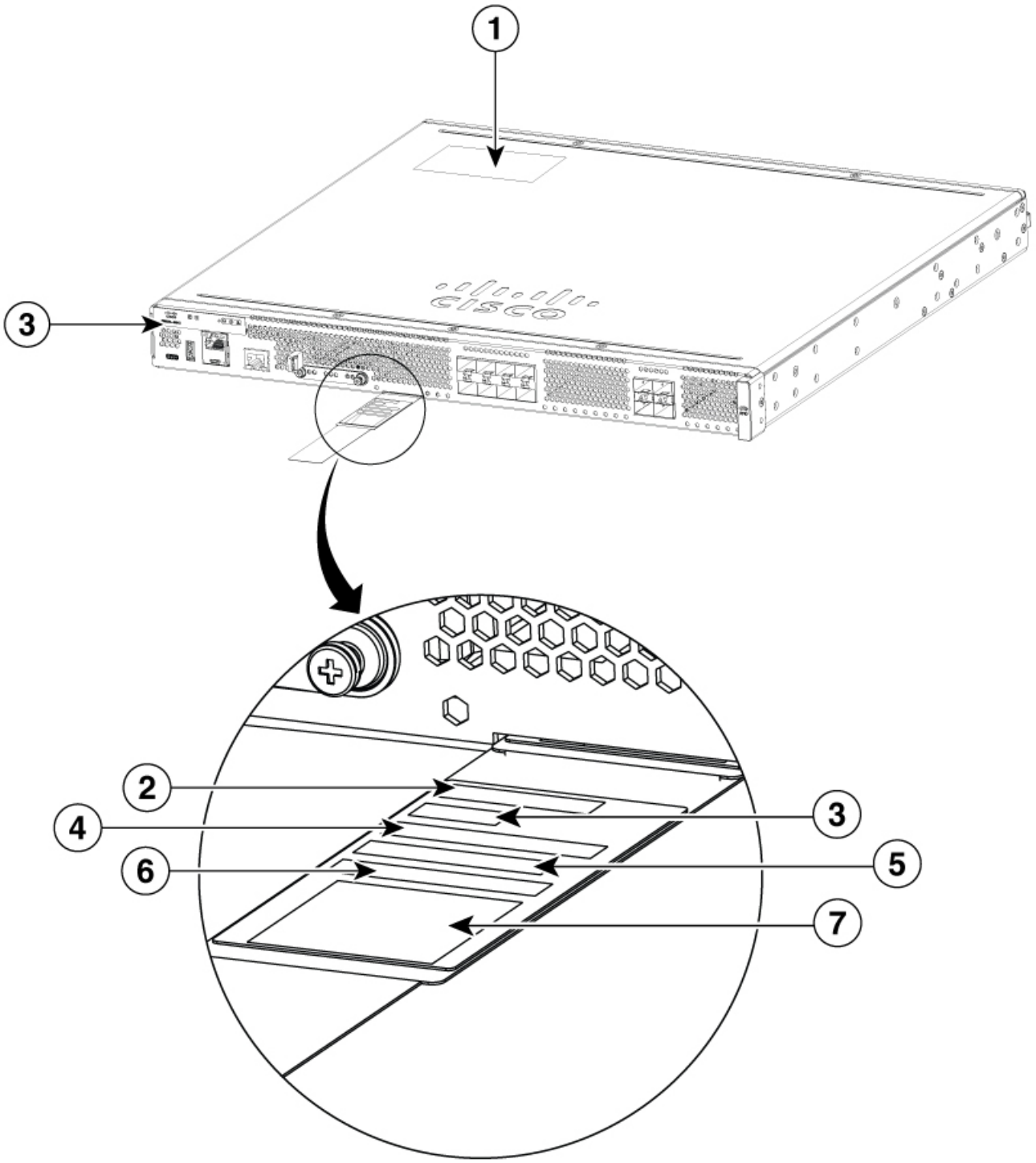


Figure 11: Label location on C8455-G2


1
2



1	Compliance label
2	Label tray
3	PID location
4	SN
5	CLEI

6	TAN
7	MAC

Locate product identification details

The serial number (SN), product ID (PID), version ID (VID), and Common Language Equipment Identifier (CLEI) are printed on a label on the bottom of the device or on the label tray.

To obtain a software license, you need the unique device identifier (UDI) of the device where the license is to be installed.

The UDI has two main components:

- Product ID (PID)
- Serial number (SN)

The UDI can be viewed using the **show license udi** command in privileged Exec mode in Cisco Internet Operating System (IOS) software.

2 Prepare for Installation

Topics:

- Standard warning statements
- Safety recommendations
- Rack requirements
- Router environmental requirements
- Power guidelines and requirements
- Console port considerations
- Ethernet connections
- Required tools and equipment for installation and maintenance

Before you begin, inspect all items for shipping damage. If anything appears to be damaged or if you encounter problems installing or configuring your router, contact customer service.

Standard warning statements

Details standard warning statements relevant to installation procedures, including cautions and regulatory compliance statements for NEBS environments to ensure adherence to safety and regulatory requirements.

Before you begin, inspect all items for shipping damage. If anything appears to be damaged or if you encounter problems installing or configuring your router, contact customer service.

Take a note of these warning statements:

Warning

Statement 7003—Shielded Cable Requirements for Intrabuilding Lightning Surge

The intrabuilding port(s) of the equipment or subassembly must use shielded intrabuilding cabling/wiring that is grounded at both ends.

The following port(s) are considered intrabuilding ports on this equipment:

Gigabit Ethernet WAN port

Warning

Statement 7005—Intrabuilding Lightning Surge and AC Power Fault

The intrabuilding port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring for more than 6 meters (approximately 20 feet). These interfaces are designed for use as intrabuilding interfaces only (Type 2, 4, or 4a ports as described in GR-1089) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection in order to connect these interfaces metallically to an OSP wiring system.

The following ports are considered intrabuilding ports on the equipment:

Gigabit Ethernet WAN port

Note

Statement 7018—System Recover Time

The equipment is designed to boot up in less than 30 minutes provided the neighboring devices are fully operational.

Note

Statement 7004—Special Accessories Required to Comply with GR-1089 Emission and Immunity Requirements

To comply with the emission and immunity requirements of GR-1089, shielded cables are required for the following ports:

Gigabit Ethernet WAN port

Note

Statement 7013–Equipment Grounding Systems–Common Bonding Network (CBN)

This equipment is suitable for installations using the CBN.

Note

Statement 8015–Installation Location Network Telecommunications Facilities

This equipment is suitable for installation in network telecommunications facilities.

Cautions and regulatory compliance statements for NEBS

The following table lists cautions, regulatory compliance statements, and requirements for the Network Equipment Building System (NEBS) certification.

Note

Statement 7015–Equipment Bonding and Grounding

When you use thread-forming screws to bond equipment to its mounting metalwork, remove any paint and nonconductive coatings and clean the joining surfaces. Apply an antioxidant compound before joining the surfaces between the equipment and mounting metalwork.

Note

Statement 8015–Installation Location Network Telecommunications Facilities

This equipment is suitable for installation in network telecommunications facilities.

Note

Statement 8016–Installation Location Where the National Electric Code (NEC) Applies

This equipment is suitable for installation in locations where the NEC applies.

Note

An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or non-conductive coatings and establish a metal-to-metal contact. Any paint or non-conductive coatings shall be removed on the surface between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.

Safety recommendations

Outlines critical safety recommendations for installation, covering safe practices when working with electricity, methods to prevent electrostatic discharge damage, and general safety precautions for handling equipment.

Follow these guidelines to ensure general safety:

- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Keep the chassis area clear and dust-free during and after installation.
- If you remove the chassis cover, place it in a safe place.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing that may get caught in the chassis. Fasten any tie or scarf and roll up sleeves.

- Wear safety glasses when working under conditions that might be hazardous to your eyes.
- Do not perform any action that may create a hazard to people or makes equipment unsafe.

Safety with electricity

Follow these guidelines when working on equipment powered by electricity:

- Locate the emergency power-off switch in the room in which you are working. If an electrical accident occurs, you can quickly turn off the power.
- Disconnect all power before doing the following:
  - Installing or removing a chassis.
  - Working near power supplies.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.
- Do not work alone if hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Never open the enclosure of the power supply.
- If an electrical accident occurs to another person, proceed as follows:
  - Use caution; do not become a victim yourself.
  - Turn off power to the device.
  - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
  - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Prevent electrostatic discharge damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It can occur if electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow these ESD prevention procedures when removing and replacing modules:

- Ensure that the router chassis is electrically connected to the ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
- If no wrist strap is available, ground yourself by touching a metal part of the chassis.

> ⚠ **Caution**
>
> For the safety of your equipment, periodically check the resistance value of the anti-static strap. It should be between 1 and 10 megohms (Mohm).

General precautions

This section describes the requirements your site must meet for the safe installation and operation of your router. Ensure that the site is properly prepared before beginning installation. If you are experiencing shutdowns or unusually high errors with your existing equipment, the guidelines provided in this section can also help you isolate the cause of failures and prevent future problems.

- Keep your system components away from radiators and heat sources, and do not block cooling vents.
- Do not spill food or liquids on your system components, and never operate the product in a wet environment.
- Do not push any objects into the openings of your system components. Doing that can cause fire or electric shock by shorting out interior components.
- Position system cables and power supply cables carefully. Route system cables and the power supply cable and plug so that they cannot be stepped on or tripped over. Be sure that nothing else rests on your system component cables or power cable.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for electrical modifications at your site. Always follow your local and national wiring rules.
- If you turn off your system, wait at least 30 seconds before turning it on again to avoid system component damage.

Rack requirements

Explains physical rack requirements necessary for secure equipment installation, describing dimensions and specifications to ensure proper fit and stability.

Some Cisco routers include brackets for use with a 19-inch rack or, if specified in your order, optional wider brackets for use with a 23-inch rack.

The following information can help you plan your equipment rack configuration:

- Allow clearance around the rack for maintenance.
- Enclosed racks must have adequate ventilation. Ensure that the rack is not congested, because each router generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. Heat generated by equipment at the bottom of the rack can be drawn upward into the intake ports of the equipment above it.
- When mounting a chassis in an open rack, ensure that the rack frame does not block the intake or exhaust ports.

Router environmental requirements

Describes environmental conditions necessary for router installation, including temperature, humidity, and ventilation requirements for optimal performance.

The Cisco C8400 Series Secure Routers should be installed in a rack. The location of your router and the layout of your equipment rack or wiring room are extremely important considerations for proper operation. Equipment placed too close

together, inadequate ventilation, and inaccessible panels can cause malfunctions and shutdowns, and can make maintenance difficult. Plan for access to both front and rear panels of the router.

When planning your site layout and equipment locations, refer to the General Site Requirements section. If you are currently experiencing shutdowns or an unusually high number of errors with your existing equipment, these precautions and recommendations may help you to isolate the cause of failure and prevent future problems.

- Ensure that the room where your router operates has adequate air circulation. Electrical equipment generates heat. Without adequate air circulation, ambient air temperature may not cool equipment to acceptable operating temperatures.
- Always follow the ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.
- Ensure that the chassis cover and module rear panels are secure. All empty network module slots, interface card slots, and power supply bays must have filler panels installed. The chassis is designed to allow cooling air to flow within it, through specially designed cooling slots. A chassis with uncovered openings permits air leaks, which may interrupt and reduce the flow of air across internal components.
- Baffles can help to isolate exhaust air from intake air. Baffles also help to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack. You can find the best placement by experimenting with different configurations.
- If equipment installed in a rack (particularly in an enclosed rack) fails, try operating the equipment individually. Power off other equipment in the rack (and in adjacent racks) to allow the router under test maximum cooling air and clean power.

Power guidelines and requirements

Details power-related guidelines and requirements for installation, including voltage, current, and grounding considerations to ensure reliable and safe operation.

Check the power at your site to ensure that you are receiving “clean” power (free of spikes and noise). Install a power conditioner if necessary.

The Cisco C8400 Secure Routers have specific power and electrical wiring requirements. Adhering to these requirements ensures reliable operation of the system. Follow these precautions and recommendations when planning your site for the Cisco Cisco C8400 Secure Routers :

- The Cisco C8400 Secure Routers are always provided with a second support dual, identical power supplies to ensure that power to the chassis continues uninterrupted if one power supply fails or input power on one line fails.
- For power redundancy, each of the two power supplies should be connectedto a separate input power source. If you fail to do this, your system might be susceptible to total power failure due to a fault in the external wiring or a tripped circuit breaker.
- To prevent a loss of input power, be sure the total maximum load on each circuit supplying the power supplies is within the current ratings of the wiring and breakers.
- Provide proper grounding to avoid personal injury and damage to the equipment due to lightning striking power lines or due to power surges. The chassis ground must be attached to a central office or other interior ground system.

For additional information, please refer to the Cisco C8400 Secure Routers datasheet.

The Cisco C8400 Secure Routers can be powered by a DC or AC source. Ensure that equipment grounding is present and observe power-strip ratings. Make sure that the total ampere rating of all the products plugged into the power strip does not exceed 80 percent of the rating.

For more information on the power supply system rating requirements for the Cisco C8400 Secure Routers, see *Power Supply* section.

Console port considerations

Explains considerations for console port connectivity, covering EIA/TIA-232 and USB serial console port types to enable proper management interface setup.

This device includes an asynchronous serial console port. You access to the device locally using a console terminal connected to the console port. This section discusses important cabling information that you must consider before connecting the device to a console terminal.

The Cisco 8400 Series Secure Routers provides one console port to connect a terminal or computer for local console access.

The console port has a RJ-45 connector, supports RJ-232 asynchronous data, and has distance recommendations specified in the IEEE RS-232 standard.

EIA/TIA-232

Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable.

The default parameters for the console port are 9600 baud, 8 data bits, 1 stop bit, and no parity. The console port does not support hardware flow control.

USB serial console port

The Micro-USB type B serial port can be used as an alternative to the RJ-45 console port. For Windows operating systems earlier than Windows 7, you must install a Windows USB device driver before using the USB console port.

Ethernet connections

Describes Ethernet connection requirements and guidelines for device communication during and after installation.

The IEEE has established the Ethernet IEEE 802.3 Standards. The routers support the following ethernet implementations:

- 1000BASE-T—1000 Mb/s full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).
- 100BASE-T—100 Mb/s full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).
- 10BASE-T—10 Mb/s full-duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable. Supports the Ethernet maximum length of 328 feet (100 meters).

Required tools and equipment for installation and maintenance

Outlines necessary tools and equipment needed for both installation and ongoing maintenance, enabling efficient and effective hardware management.

You need the following tools and equipment to install and upgrade the router and its components:

- ESD-preventive cord and wrist strap
- Number 2 Phillips screwdriver
- Phillips screwdrivers: small, 3/16-in. (4 to 5 mm) and medium, 1/4-in. (6 to 7 mm)
  - To install or remove modules
  - To remove the cover, if you are upgrading memory or other components

- Screws that fit your rack
- Wire crimper
- Wire for connecting the chassis to an earth ground:
  - AWG 6 (13 mm 2) wire for NEBS-compliant chassis grounding
  - AWG 14 (2 mm 2) or larger wire for NEC-compliant chassis grounding
  - AWG 18 (1 mm 2) or larger wire for EN/IEC 60950-compliant chassis grounding
- For NEC-compliant grounding, an appropriate user-supplied ring terminal, with an inner diameter of 1/4 in. (5 to 7 mm)

In addition, depending on the type of modules you plan to use, you might need the following equipment to connect a port to an external network:

- Cables for connection to the WAN and LAN ports (dependent on configuration)

> **Note**
>
> For more information on cable specifications, see the Cisco Modular Access Router Cable Specifications document at cisco.com.

- Ethernet hub or PC with a network interface card for connection to an Ethernet (LAN) port.
- Console terminal (an ASCII terminal or a PC running HyperTerminal or similar terminal emulation software) configured for 9600 baud, 8 data bits, 1 stop bit, no flow control, and no parity.
- Modem for connection to the auxiliary port for remote administrative access (optional).
- Data service unit (DSU) or channel service unit/data service unit (CSU/DSU) as appropriate for serial interfaces.
- External CSU for any CT1/PRI modules without a built-in CSU.

3 Install and Connect

Topics:

- Install and connect
- Install the routers
- Connect to a console terminal or modem

Install and connect

Introduces the overall steps for installing and connecting the router, summarizing key installation phases, physical setup, and initial preparations required to begin system configuration.

This section describes the installation procedure for C8475-G2 and C8455-G2 in an equipment rack.

- Two-post rack, either 19 inch or 23 inch. Inner clearance (the width between the inner sides of the two posts or rails) must be at least 19 inches (48.26 cm) or 23 inches (58.42 cm). Airflow through the chassis is from front to back (I/O-side to PSU-side).
- (Only supported on C8475-G2) Four-post, 19-inch equipment rack. Inner clearance (the width between the inner sidesof the two posts or rails) must be at least 19 inches (48.26 cm). Airflow through the chassis is from front to back.

Unpack the router

Details the procedures for safely unpacking the router, including handling instructions and inspection of the device and its components prior to installation.

Do not unpack the device until you are ready to install it. If the final installation site will not be ready for some time, keep the chassis in its shipping container to prevent accidental damage. When you are ready to install the chassis, proceed with unpacking it.

The chassis, accessory kit, publications, and any optional equipment you ordered may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you received all of the items on the list.

Before you begin

Explains essential pre-installation requirements and preparations, outlining site requirements, tools, and safety considerations necessary before proceeding with the router installation.

Before installing and connecting a Cisco 8400 Series Secure Router, read the safety warnings and gather the tools and equipment. See the *Required Tools and Equipment for Installation and Maintenance* section, for more information about the required tools and equipment.

CLI console access

Describes available methods for accessing the router's CLI through console connections, emphasizing requirements and supported configurations for command-line interface interaction.

Use the USB or RJ-45 console port on the router to access the Cisco Internet Operating System (IOS-XE) and IOS XE SD-WAN command line interface (CLI) on the router and perform configuration tasks. A terminal emulation program is required to establish communication between the router and a PC. See the Connect to a Console Terminal or Modem section in this document for instructions.

> **Note**
>
> A Microsoft Windows USB driver must be installed before you establish physical connectivity between the router and the PC.

Install the routers

Guides you through the complete router installation process, covering chassis mounting options such as rack installation, bracket attachment, mid-mounting, and four-post rack mounting for various deployment scenarios.

If you need to install Field-Replaceable Units (FRUs), you can install them either before or after you install the device. Ideally, you install the modules when you have access to the I/O side of the device. Internal modules (memory cards and fan trays) should be installed before rack-mounting.

The Cisco 8400 Series Secure Routers are designed to be rack-mounted.

Warning

Before working on a system that has an on/off switch, turn OFF the power and unplug the power cord that is in the chassis. Statement 1

Caution

To prevent damage to the chassis, do not attempt to lift or tilt the chassis by holding it by the plastic panel on the front. Always hold the chassis by the sides of the metal body.

Mount the chassis on a rack

Warning

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 40C degrees on a continuous basis.

The Cisco 8400 Series Secure Routers can be installed in a 19-inch (48.26-cm) EIA or a 23-inch (58.42-cm) Southwestern Bell Corporation (SBC) racks. The Cisco 8400 Series Secure Routers can also be mounted in a 600-mm ETSI rack. Use the standard brackets shipped with the router for mounting the chassis in a 19-inch EIA rack; you can order optional larger brackets for mounting the chassis in a 23-inch SBC rack.

You can mount the devices in the following ways:

- PS Mounting–Brackets are attached at the PS side of the chassis with the the PSUs facing forward.
- I/O Mounting–Brackets are attached at the I/O side of the chassis with the I/O side facing forward.
- Mid-Mounting –Brackets can be recessed or rotated to support multiple mounting-depth options.

Attach the rack-mounting brackets

> **Caution**
>
> Do not over-torque the screws. The recommended torque is 15 to 18 inch-lbs (1.7 to 2.0 N-m).

> **Caution**
>
> Your chassis installation must allow unrestricted airflow for chassis cooling.

Attach the mounting brackets to the chassis as shown in the below figure using the screws provided. Use a #2 Philips screwdriver.

To attach the rack-mounting brackets to the Cisco 8400 Series Secure Routers , perform these steps:

Step1. Select the depth location for the router in the equipment rack.

Step2. Align the rack mount bracket with the mounting holes in the side of the router.

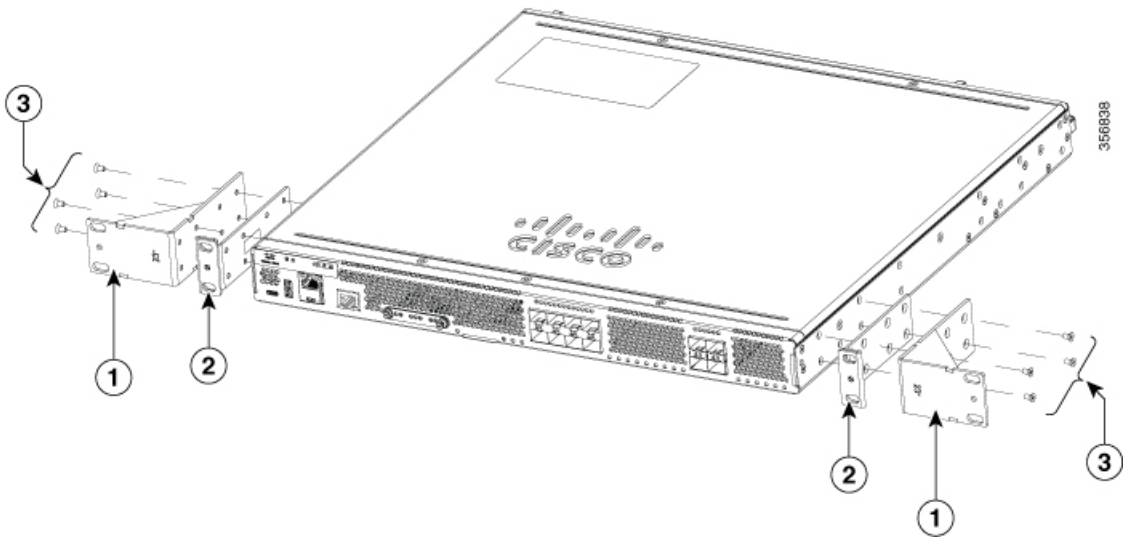
Step3. Insert the #6-32 FHM screws. Use only the screws that are provided in the rack mount bracket kit.

Step4. Tighten the screws to a torque value of 15 to 18 inch-lb. (1.7 to 2.0 N-m).

Figure 12: Installation of 19" or 23" brackets (I/O side shown)

Important

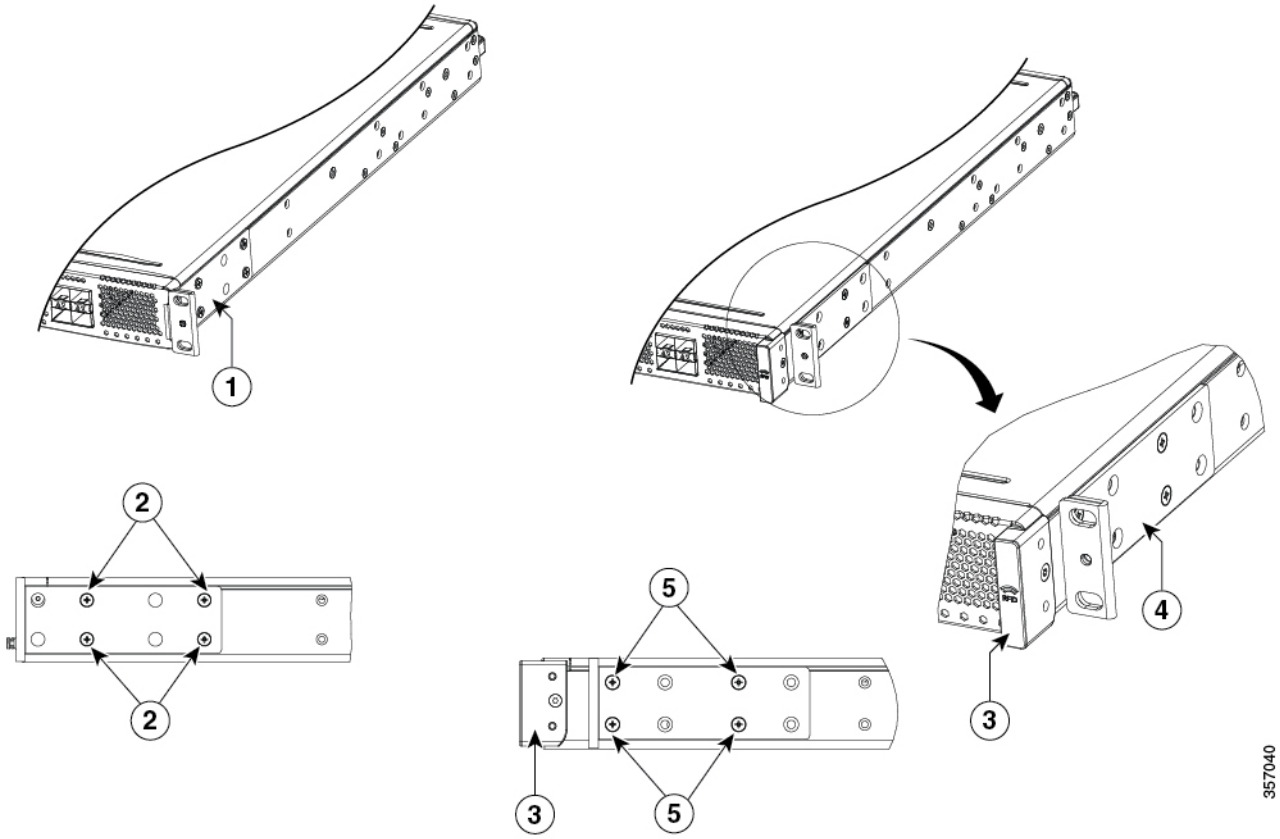
This image is for reference only.



1 2

3 Screws (#6-32 or M5)

Figure 13: Rack mount bracket positions (I/O Side)



1 Mounting bracket (for front (PSU) side)

2 Screws for (for front (PSU) side)

3 PSU

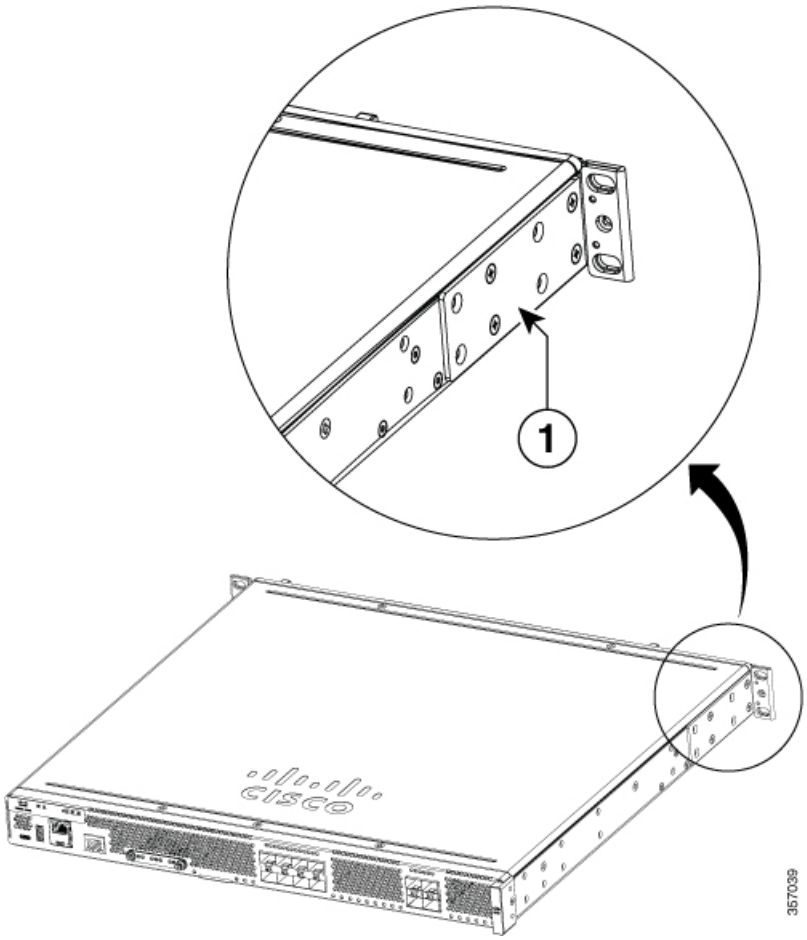
4 Mounting bracket (for rear (fan) side)

5 Se
th
fo
(R
ex
(w
RE

Figure 14: Install brackets for PS mounting

Important

This image is for reference only.

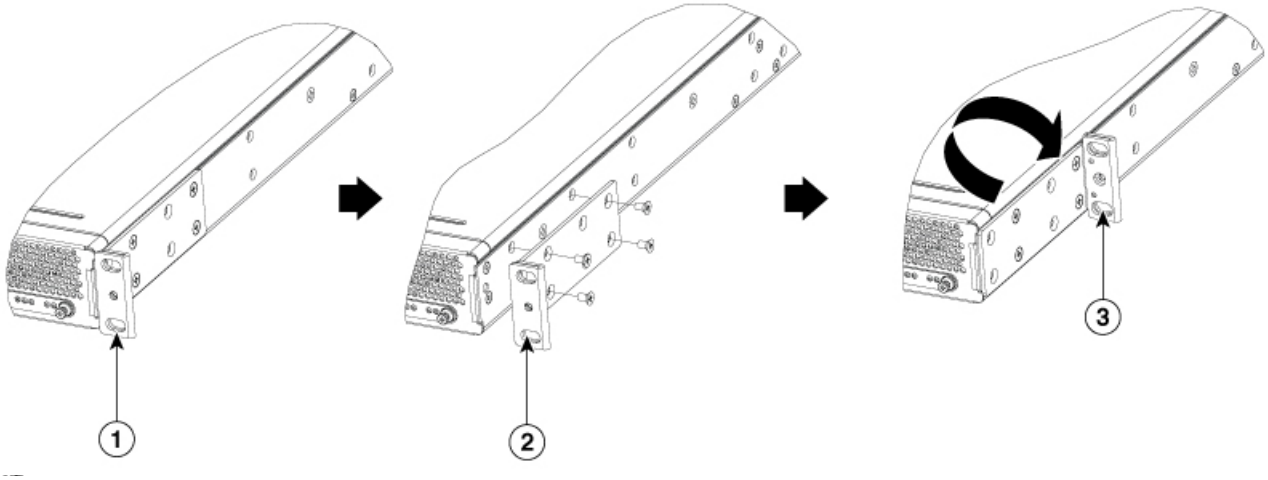


1 Th
ha

Mid-mount the chassis

The Cisco 8400 Series Secure Routers can achieve many mounting depths by recessing or rotating the mounting bracket. In the example below, the I/O-Flush can be converted to middle-mount by rotating the bracket against the chassis to move the mounting flange away from the I/O face.

Figure 15: Securing the



1	Forward-facing bracket
2	Screws securing the forward-facing bracket removed
3	Bracket reversed to rear-facing and reversed

Following are all the possible mounting-depth options for the C8455-G2 and C8475-G2 (including I/O-flush and PSU-flush).

I/O Side Mounting

Figure 16: Brackets rotated flange towards I/O side

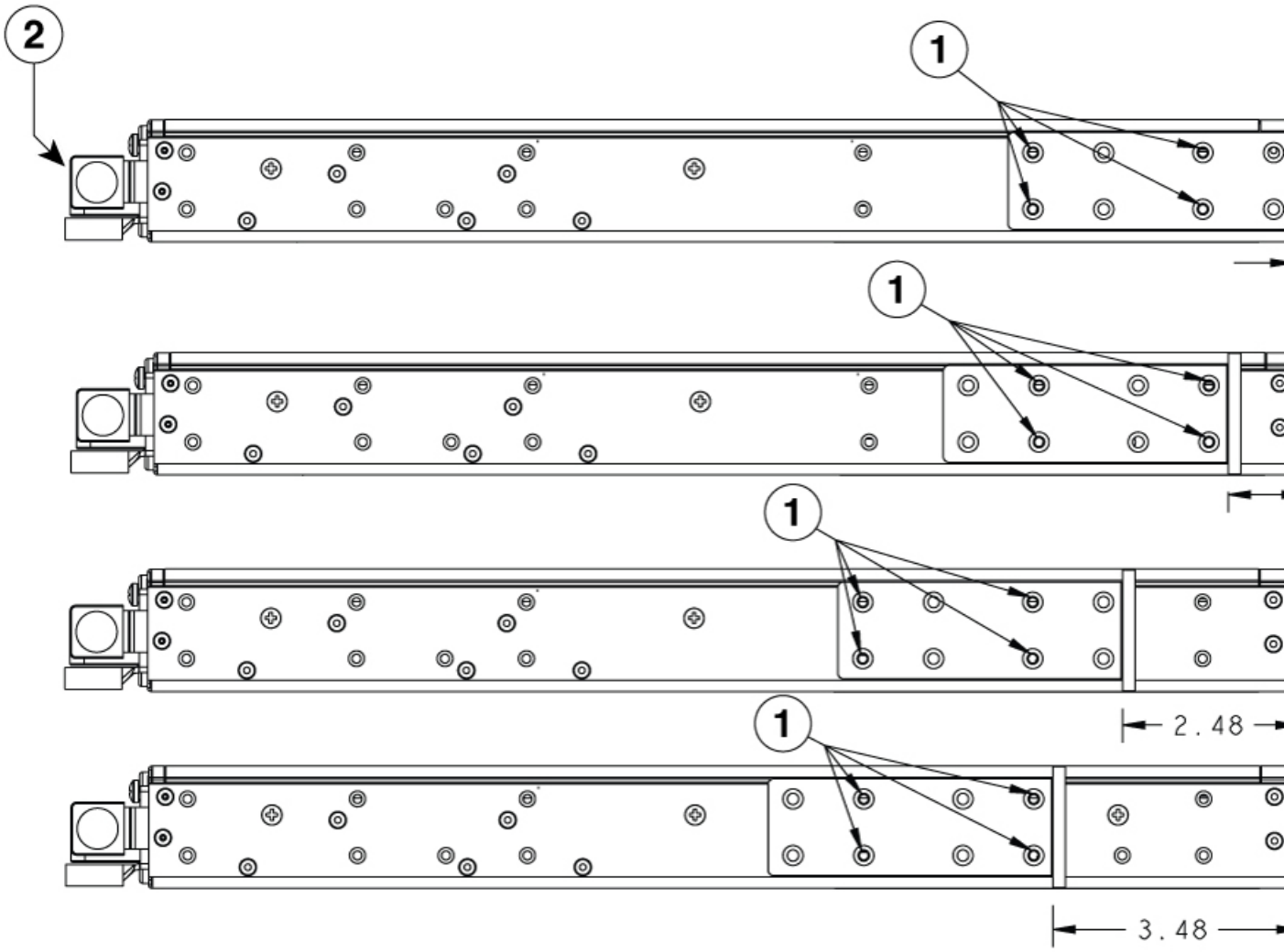
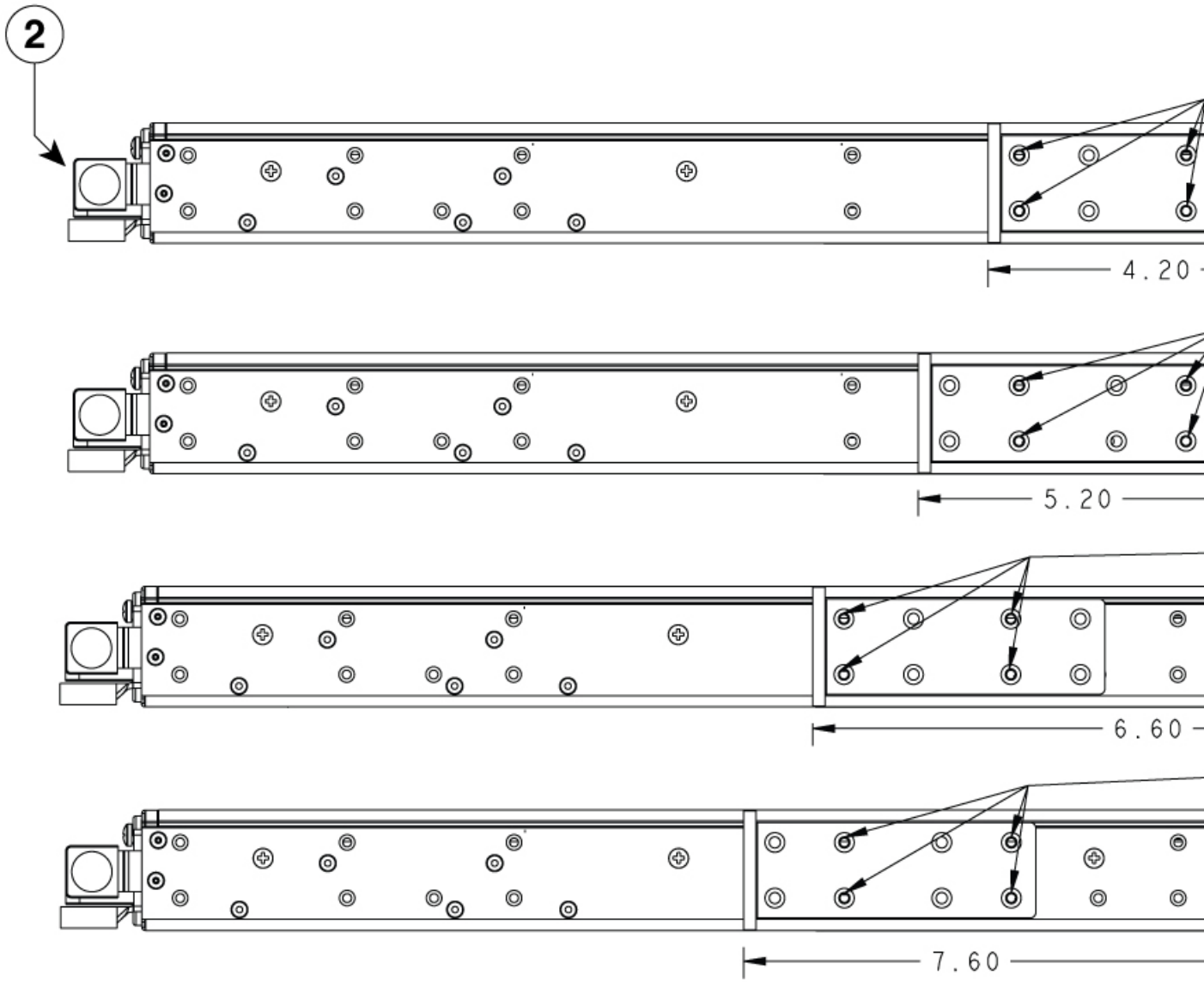


Figure 17: Brackets rotated flange away from I/O side



PSU Side Mounting

Figure 18: Brackets rotated flange towards PSU side

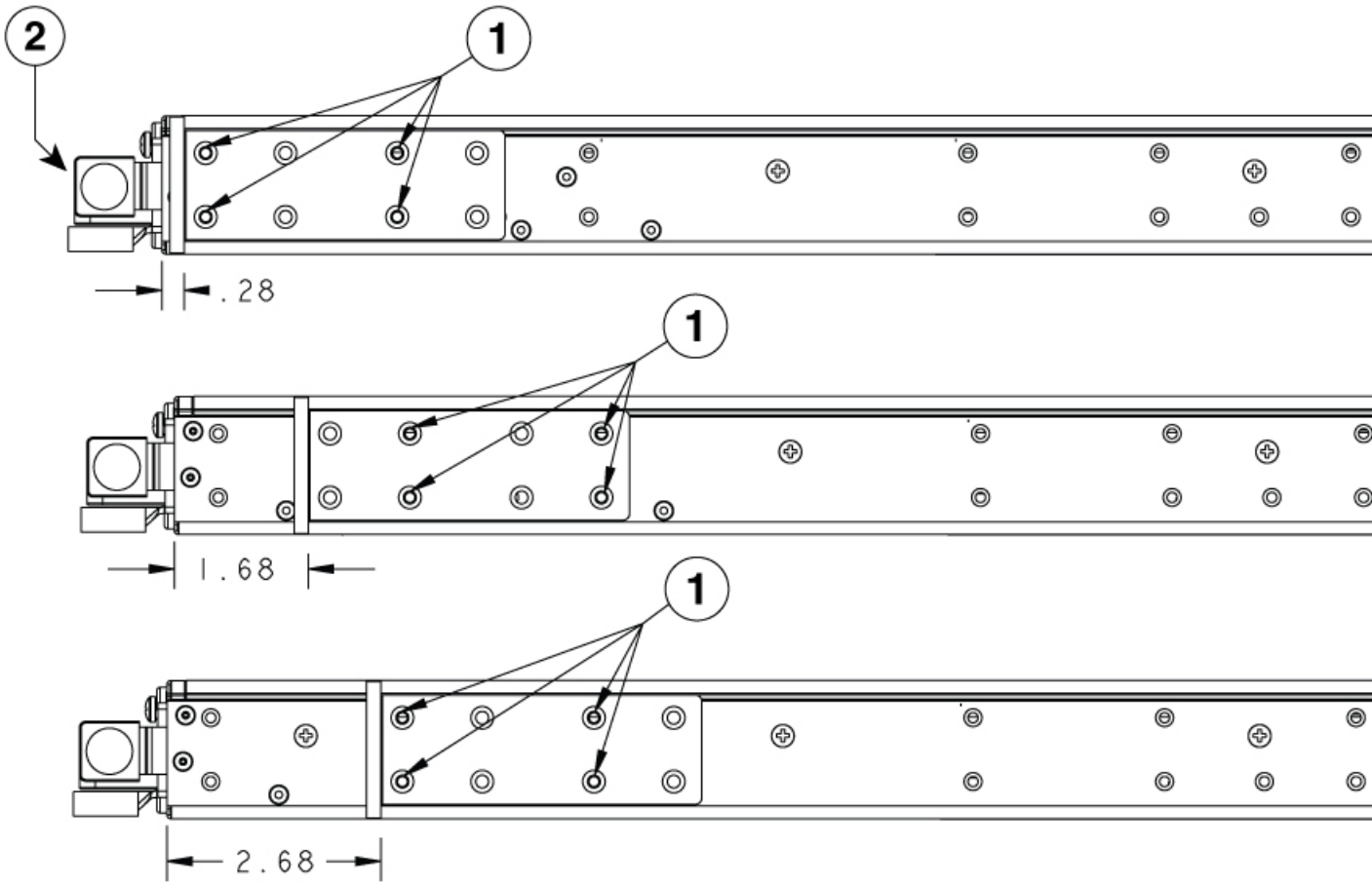
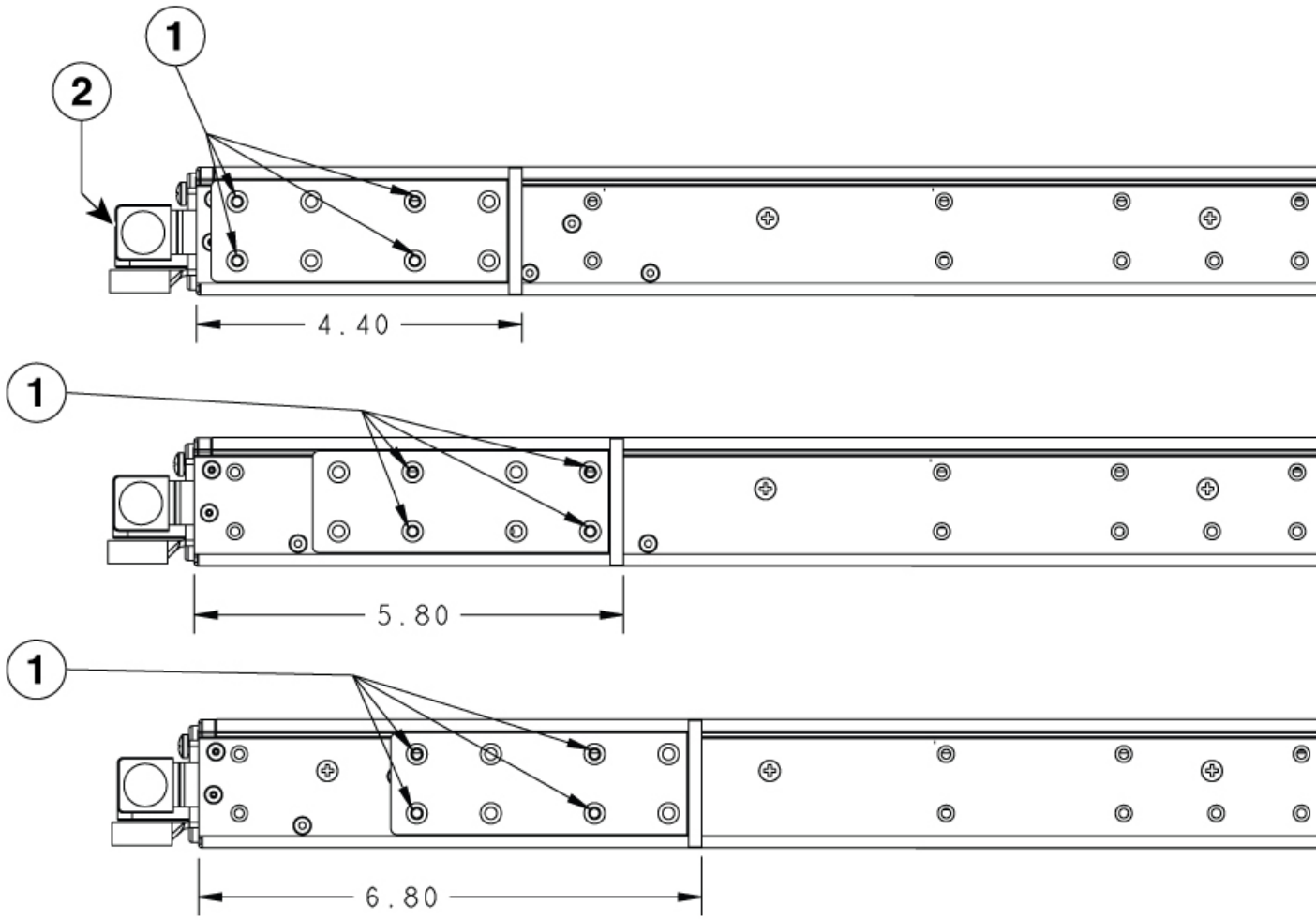
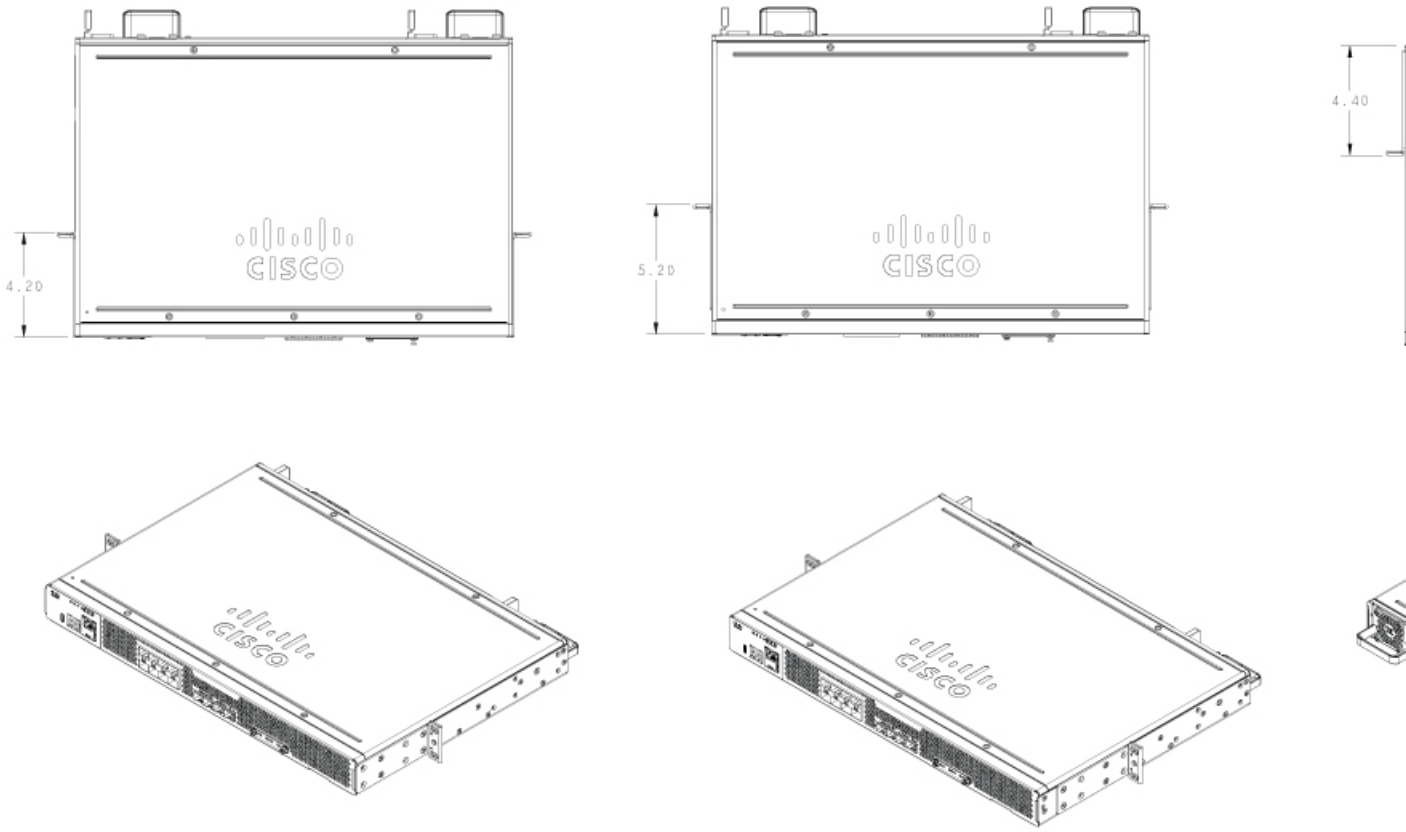


Figure 19: Brackets rotated flange away from PSU side



1	Securing Locations
2	PSU side
3	I/O side

The C8455-G2 is a shorter depth chassis and therefore has fewer options. The mid-mount depth options are shown below in isometric views.



Mount the chassis in a rack

After you attach the rack-mount brackets to the chassis, use screws to install the chassis in the rack.

Tip

For both the 19-inch EIA brackets and the 23-inch brackets, start the lower pair of screws first, and rest the brackets on the lower screws while you insert the upper pair of screws.

Tip

The screw slots in the brackets are spaced to line up with every *second* pair of screw holes in the rack. When the correct screw holes are used, the small threaded holes in the brackets line up with unused screw holes in the rack. If the small holes do not line up with the rack holes, you must raise or lower the brackets to the next rack hole.

Warning

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.

Warning

Statement 1006—Chassis Warning for Rack-Mounting and Servicing

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Warning

Statement 1032—Lifting the Chassis

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules, such as power supplies, fans, or cards. These types of handles are not designed to support the weight of the unit.

Figures below shows a typical rack mounting of a chassis in a rack.

Step1. Locate the desired position in the equipment rack.

Step2. Align the holes in the rack mount brackets with the mounting holes in the equipment frame.

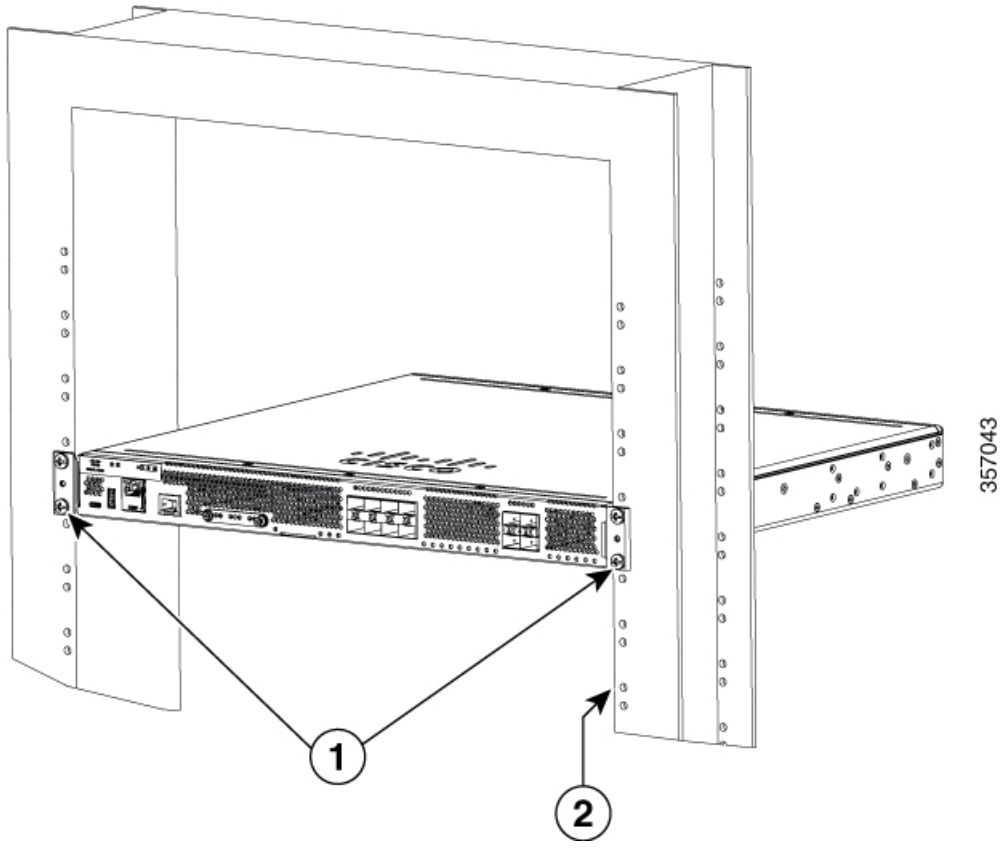
Step3. Secure the device using mounting screws appropriate for your equipment frame. The rack mount brackets have been designed for #12 screws.

Step4. Tighten the screws to the appropriate torque value for your equipment

Figure 20: I/O Flush Mount in 19-inch Rack without RFID

Note

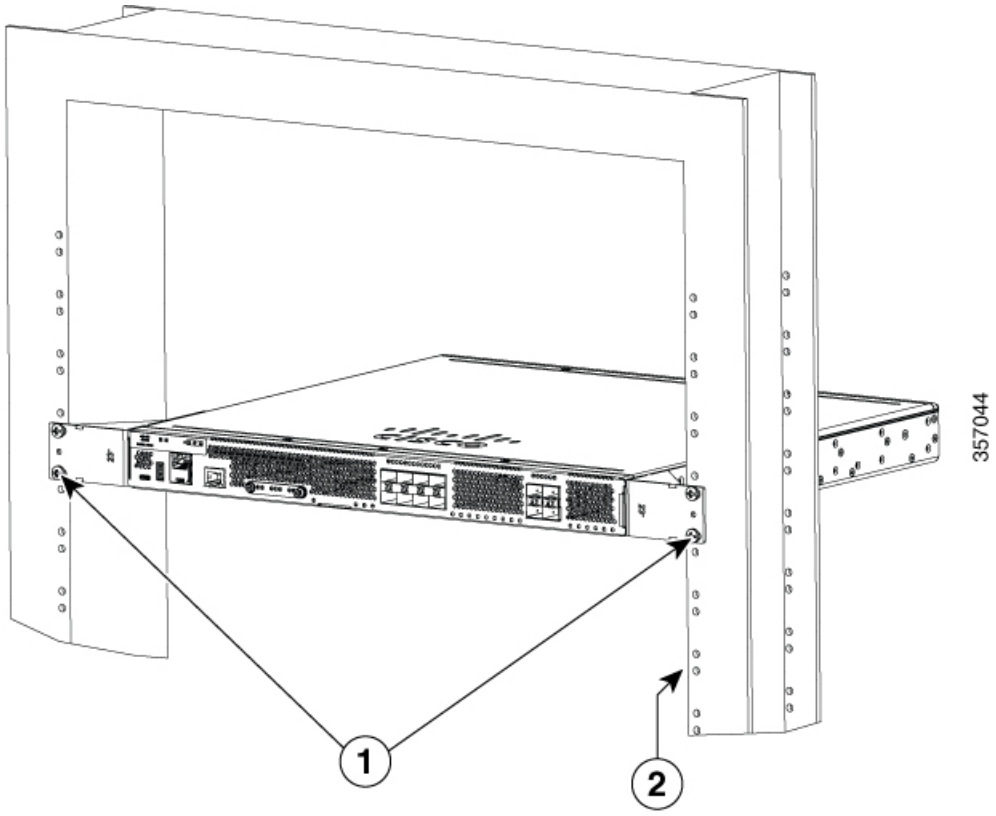
This image is for reference only.



1	Rack Mounting screws	2	Rack

Figure 21: I/O Flush Mount in 23-inch Rack without RFID

> **Note**
>
> This image is for reference only.



1	Rack Mounting screws	2	Rack

Four-post rack mounting

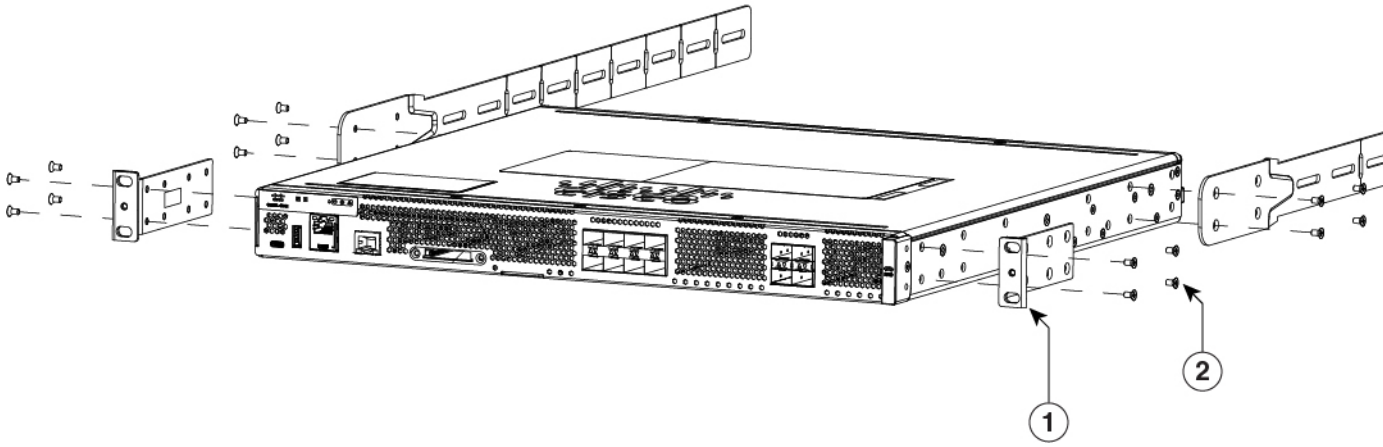
The four-post rack mounting is only supported on 19-inch equipment racks. The four-post mounting kit includes two standard 19-inch rack mount brackets and two rear support brackets. This kit does not include screws to secure the brackets to the frame.

> **Note**
>
> The four-post rack mounting is not supported on C8455-G2 router as it is a short-depth chassis.

1. Assemble the two standard 19-inch rack mounting brackets in the desired location.
2. Assemble the rear mount chassis brackets on the opposite ends of the router.

Figure 22: Mounting the router in a four-post rack

> **Note**
>
> This image is for reference only.



1 2

3

3. Secure the router in the rack with the 19-inch rack mounting brackets.
4. Slide the four-post mount rack brackets on to the rear mount brackets until they make contact with the rear frame. Finger tighten the screws securing the four-post mount rack brackets to the rear frame to verify the correct mounting location.

Figure 23: Secure the router in a four-post rack

> **Note**
>
> This image is for reference only.



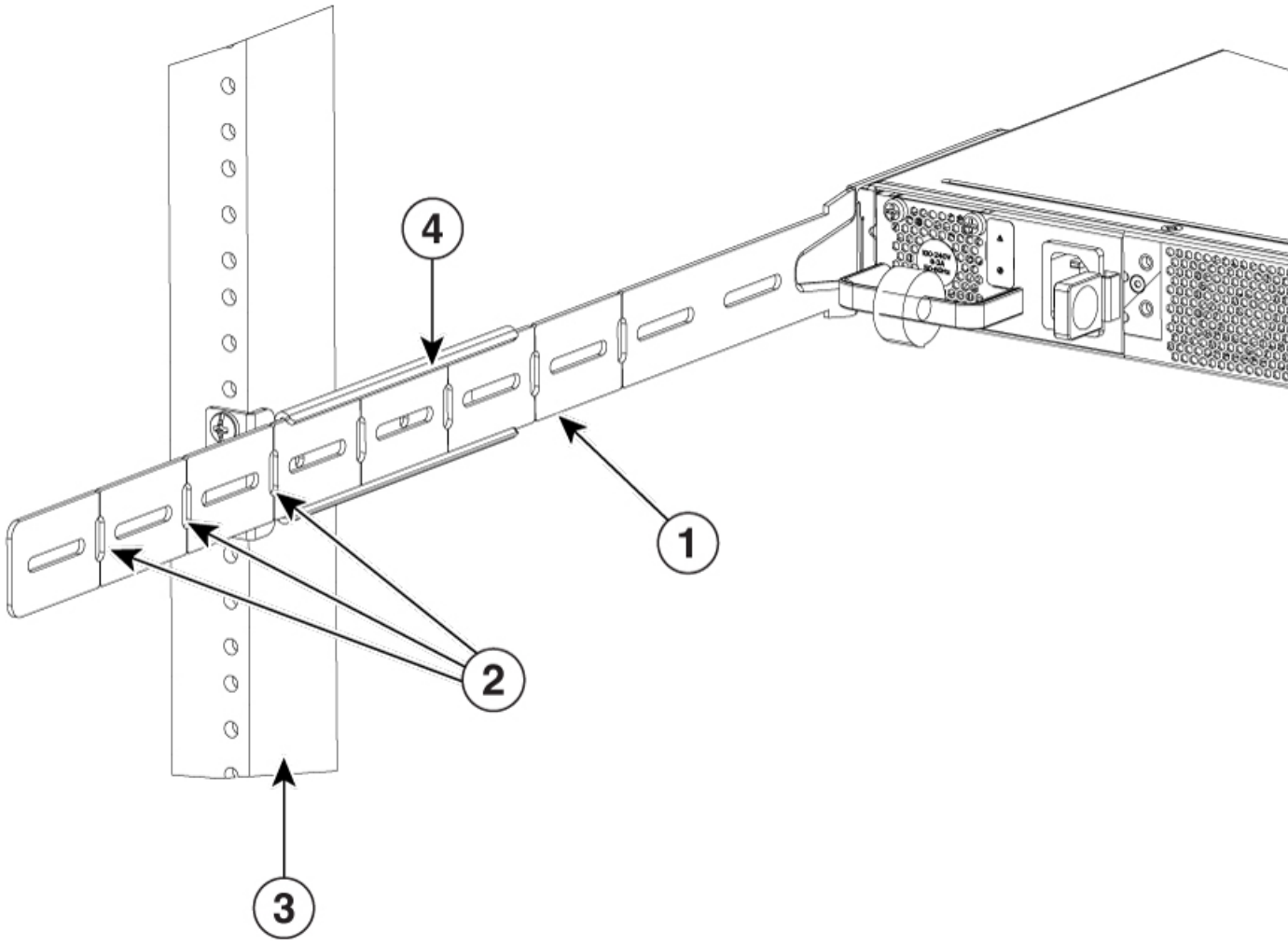
1 2
3 4
5

5. The rear mount chassis bracket may extend beyond the rear frame. The bracket can be shortened by breaking off a length of the bracket at one of the vertical score lines. It is recommended that the bracket be shortened so that it does not protrude beyond the back rails and become a safety hazard. To shorten the bracket, mark the appropriate score line, remove the 4-point mount rack bracket, break the bracket at the designated score line, then re-assemble the four-post mount rack bracket.

Figure 24: Brackets in a four-post rack

Note

This image is for reference only.



1 Rear mounting bracket in the front of the rack

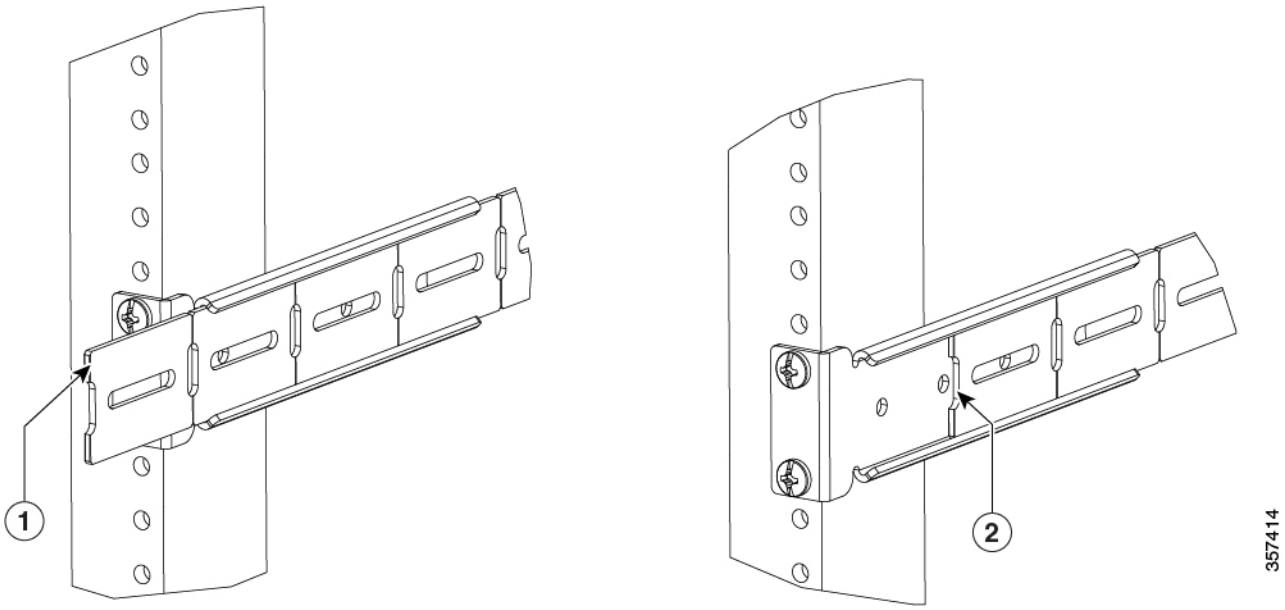
2 Vertical rack rails

3 Rear mount chassis bracket recessed within the rear post

4 Front mount chassis bracket

Figure 25: Rear mount chassis bracket recesssed within the rear post

> **Note**
>
> This image is for reference only.



1 Rear mount chassis bracket aligned with the rear post

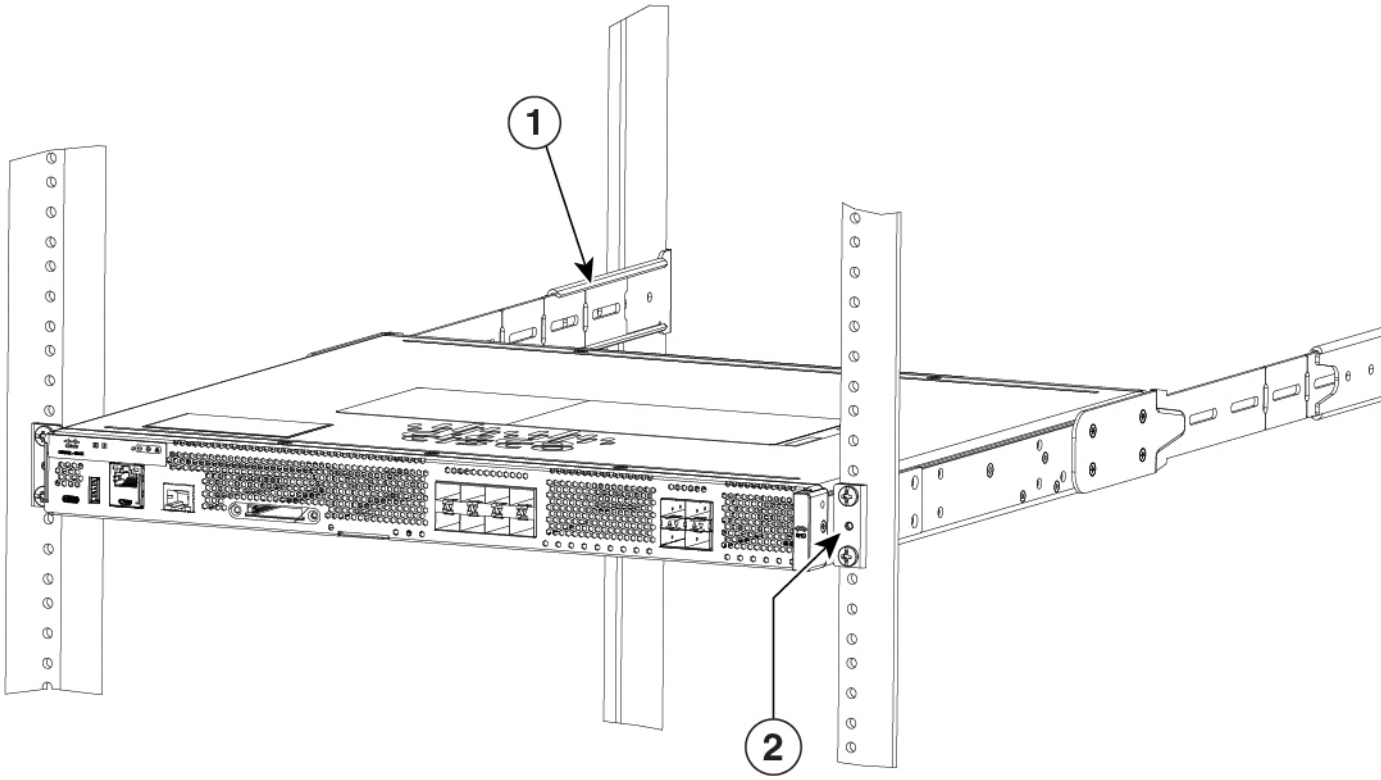
2 Rear mount chassis bracket recessed within the rear post

6. Once everything is adjusted, tighten all the rack-mount screws starting at the front 19-inch mounting brackets, then securing the rear four-post brackets.

Figure 26: Router secured in 19-inch mounting bracket

Note

This image is for reference only.



1 Ra
ma
dis
lat
in
Ch
of
fas
ma
lat
tal
to
be
ed
vi
te
fas
ma
ak
lat

2 In
ma
lat

3 Rear of the chassis

4 Ground lug mounting bracket holes

Chassis grounding

Outlines the steps for properly grounding the router chassis, ensuring safe installation and compliance with electrical safety standards.

You must connect the chassis to a reliable earth ground; the ground wire must be installed in accordance with local electrical safety standards.

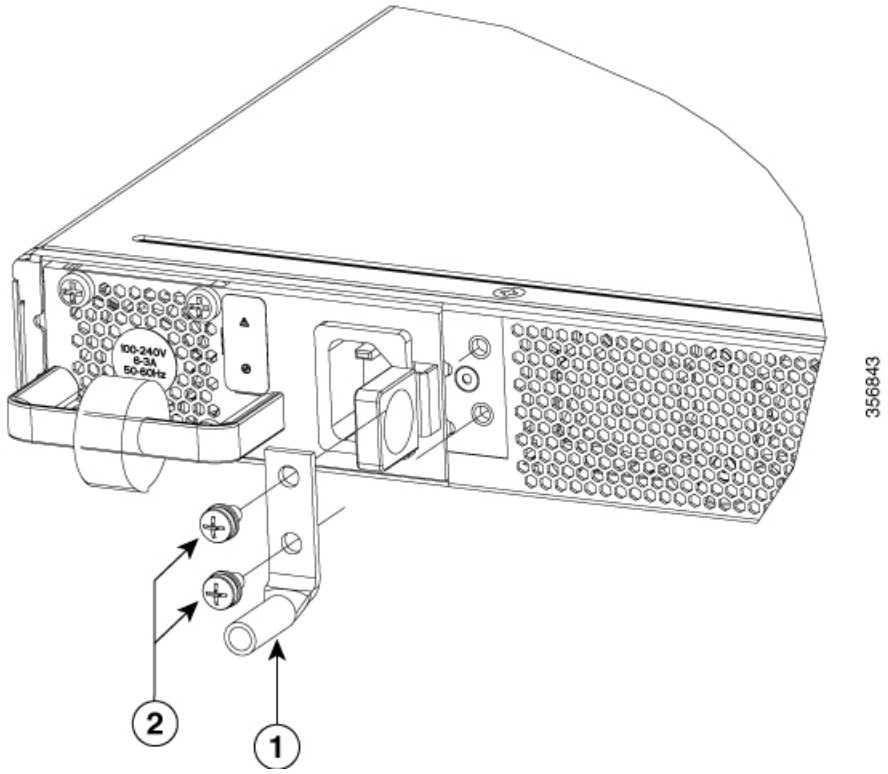
- For grounding, use size 6 AWG (13 mm 2) copper wire and the ground lug provided in the accessory kit.

To install the ground connection for your router, perform the following steps:

Procedure

1. Strip one end of the ground wire to the length required for the ground lug or terminal.
   - For the ground lug—approximately 0.75 inch (20 mm)
   - For user-provided ring terminal—as required
2. Crimp the ground wire to the ground lug or ring terminal, using a crimp tool of the appropriate size.
3. Attach the ground lug or ring terminal to the chassis . For a ground lug, use the two screws with captive locking washers provided. For a ring terminal, use one of the screws provided. Tighten the screws to a torque of 8 to 10 in-lb (0.9 to 1.1 N-m).

Figure 27: Chassis ground connection



4. Connect the other end of the ground wire to a known reliable earth ground point at your site.

1	Ground lug
2	M4X0.7mm Screws

Connect to a console terminal or modem

Explains procedures for connecting the router to a console terminal or modem, including specific instructions for establishing console access from Mac OS X and Linux platforms.

The Cisco 8400 Series Secure Routers have asynchronous serial ports. These ports provide administrative accessto the router either locally (with a console terminal or a PC).To configure the router through the Cisco IOS CLI, you must establish a connection between the router console port and either a terminal or a PC.

Use the following cables and adapters to establish a local or remote connection.

Figure 28: Ports

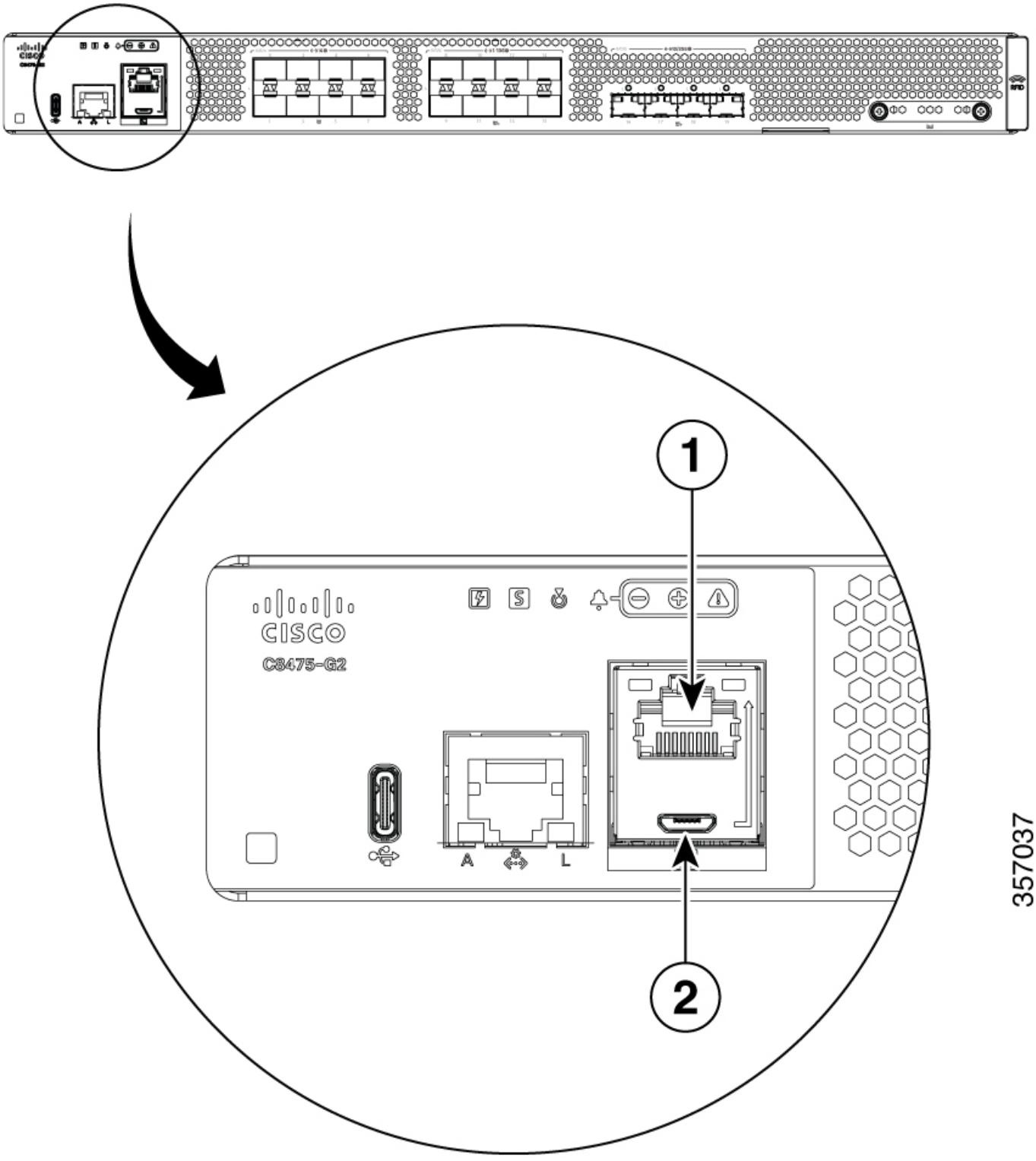


Table 8: Local and remote connections

Port Type	Cable
1. Serial (RJ-45)	EIA RJ-45
2. Serial (USB)	USB 5-pin micro USB Type-B-to-USB Type-A

Connect to the Console Port with Mac OS X

This procedure describes how to connect a Mac OS X system USB port to the console using the built in OS X Terminal utility.

Procedure

1. Use the Finder to go to Applications > Utilities > Terminal.
2. Connect the OS X USB port to the router.
3. Enter the following commands to find the OS X USB port number

   Example

   ```
   macbook:user$ cd /dev
   macbook:user$ ls -ltr /dev/*usb*
   crw-rw-rw-  1 root    wheel       9,  66 Apr  1 16:46 tty.usbmodem1a21
   DT-macbook:dev user$
   ```

4. Connect to the USB port with the following command followed by the router USB port speed

   Example

   ```
   macbook:user$ screen /dev/tty.usbmodem1a21 9600
   ```

   To disconnect the OS X USB console from the Terminal window

   Enter Ctrl-a followed by Ctrl-\

Connect to the Console Port with Linux

This procedure shows how to connect a Linux system USB port to the console using the built in Linux Terminal utility.

Procedure

1. Open the Linux Terminal window.
2. Connect the Linux USB port to the router.
3. Enter the following commands to find the Linux USB port number

   Example

   ```
   root@usb-suse# cd /dev
   root@usb-suse /dev# ls -ltr *ACM*
   crw-r--r--    1 root     root     188,   0 Jan 14 18:02 ttyACM0
   root@usb-suse /dev#
   ```

4. Connect to the USB port with the following command followed by the router USB port speed

Example

```
root@usb-suse /dev# screen /dev/ttyACM0 9600
```

To disconnect the Linux USB console from the Terminal window

Enter Ctrl-a followed by : then quit

4 Install and Upgrade Internal Modules and Field Replaceable Units

Topics:

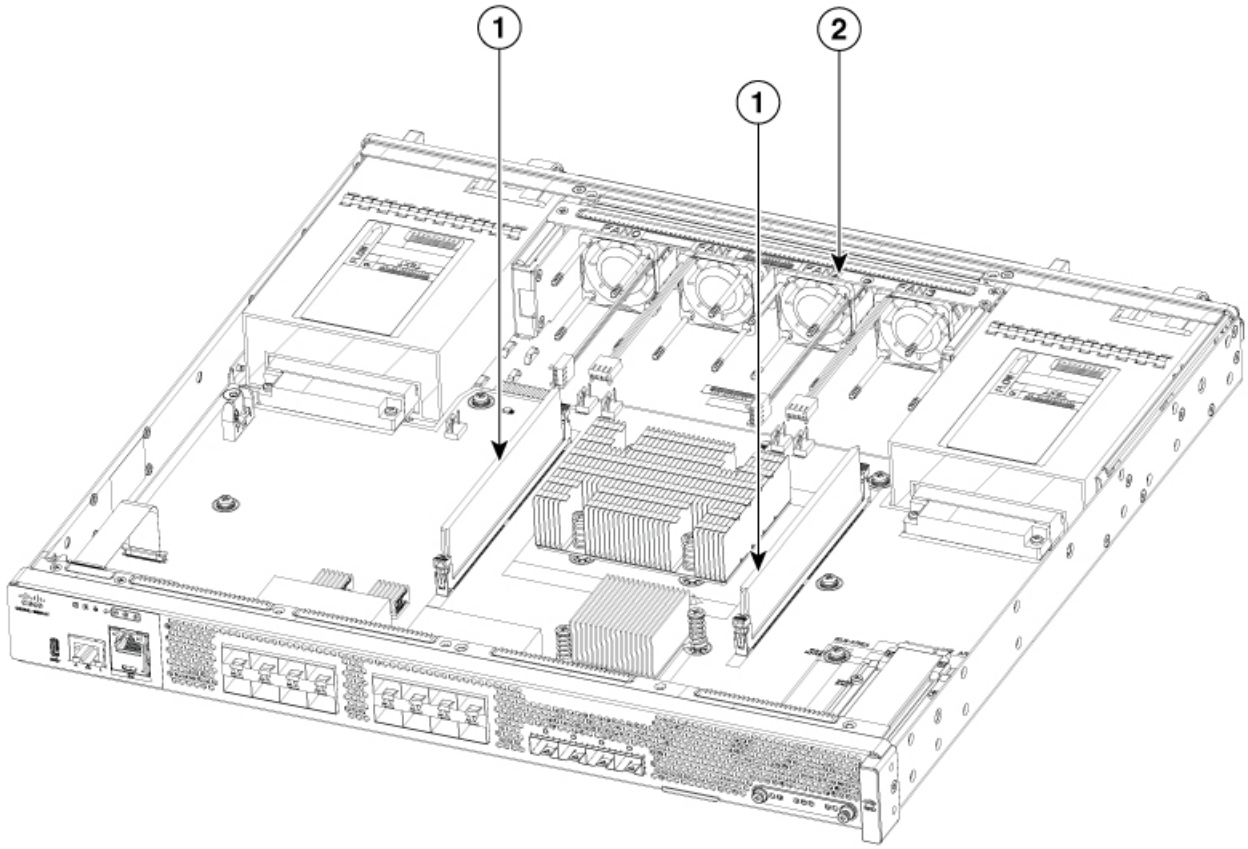
- Internal modules
- Remove and replace the chassis cover
- Remove and replace DDR DIMMs
- AC power supply
- DC power supply
- Remove and replace the power supplies
- AC/DC/HVDC power supply
- Fan tray
- SFP modules
- M.2 storage device
- Remove and replace the battery

Internal modules

Introduces internal module components and their roles, providing conceptual information to help you understand available module types and integration within the system.

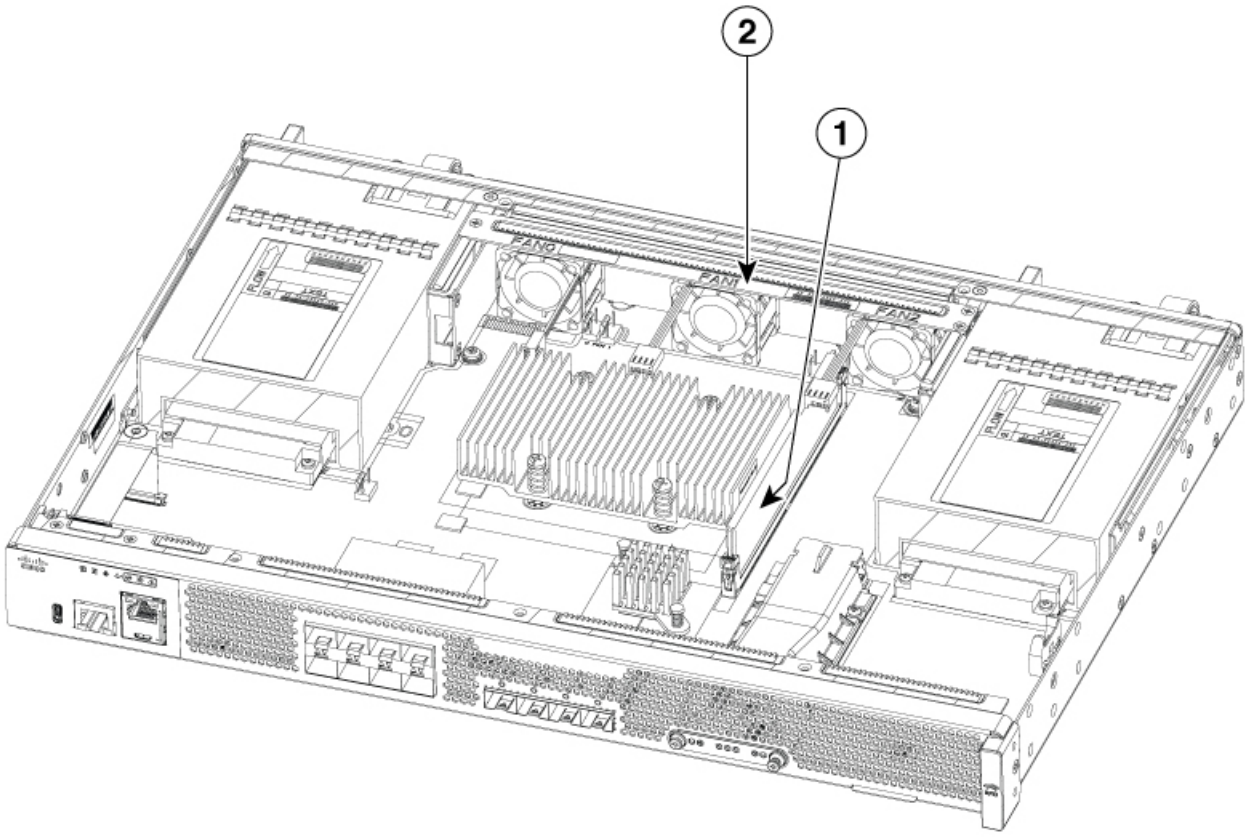
To access the internal modules on the device, you must first remove the chassis cover. For instructions on how to remove and replace the chassis cover on the device, see the sections on Precautions on page 60.

Figure 29: Internal module locations in the C8475-G2



Number	Description
1	DIMMs
2	Fan tray

Figure 30: Internal module locations in the C8455-G2



Number	Description
1	DIMM
2	Fan tray

Remove and replace the chassis cover

Details the removal and replacement of the chassis cover, including necessary precautions, procedures for removing and reinstalling the cover, and safety steps to prevent equipment damage.

Precautions

Before removing the cover, note these details:

- Do not run the router with the cover off. Doing so can cause the router to overheat.
- Disconnect all power cables.
- Remove the device from the rack
- Use a number-2 Phillips screwdriver to perform the following tasks.

Remove the chassis cover

To remove the cover, perform these steps:

Procedure

1. Read the Safety Warnings and disconnect the power supply before you perform any module replacement.
2. Confirm the device is turned off and disconnected from the power supply or power supplies. If a redundant power is used, disconnect from the redundant power supply.
3. Place the chassis on a flat surface.
4. Remove the top and side cover screws.
5. Lift the cover straight up.

Replace the cover

To replace the cover, perform these steps:

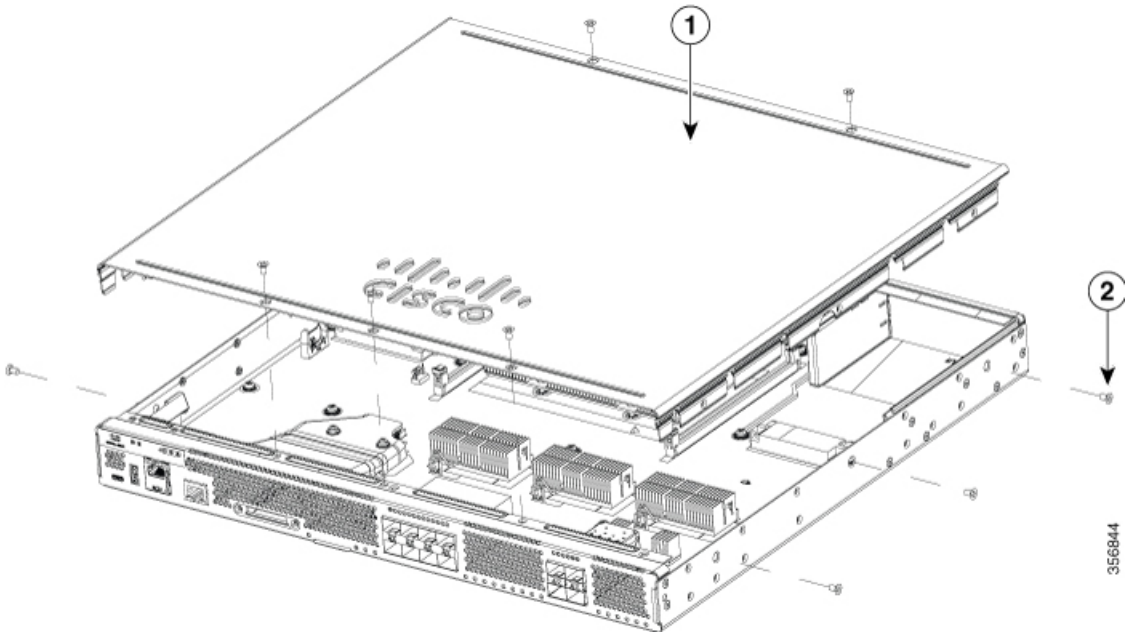
Procedure

1. Place the chassis on a flat surface.
2. Drop the cover straight down and ensure that the side flanges insert into the chassis. Care should be taken to not damage the EMC Gaskets.

> **Note**
>
> The correct orientation of the cover is determined by location of the CISCO logo as shown in image below.

3. Install the top and side cover screws.

Figure 31: Install the cover



1 [illegible]

2 [illegible]

Remove and replace DDR DIMMs

Guides you through handling DDR DIMMs, covering identification, orientation, safe removal, and installation processes to upgrade or replace system memory modules.

To access the DIMMs, you must remove the chassis cover as described in the *Access and Install Modules* section.

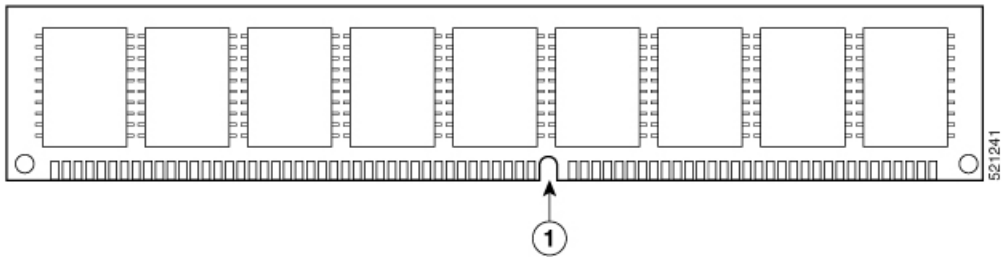
> **Caution**
>
> Always wear an ESD-preventive wrist strap and ensure that it makes good contact with your skin when you remove or install DIMMs. Connect the equipment end of the wrist strap to the metal part of the chassis.

> **Caution**
>
> Handle DIMMs by the edges only. DIMMs are ESD-sensitive components and can be damaged by mishandling.

Locate and orient DIMM

DIMMs have a polarization notch on the mating edge to prevent incorrect insertion. This image shows the polarization notch on a DIMM.

Figure 32: DIMM showing polarization notch



Number	Description
1	Polarization notch

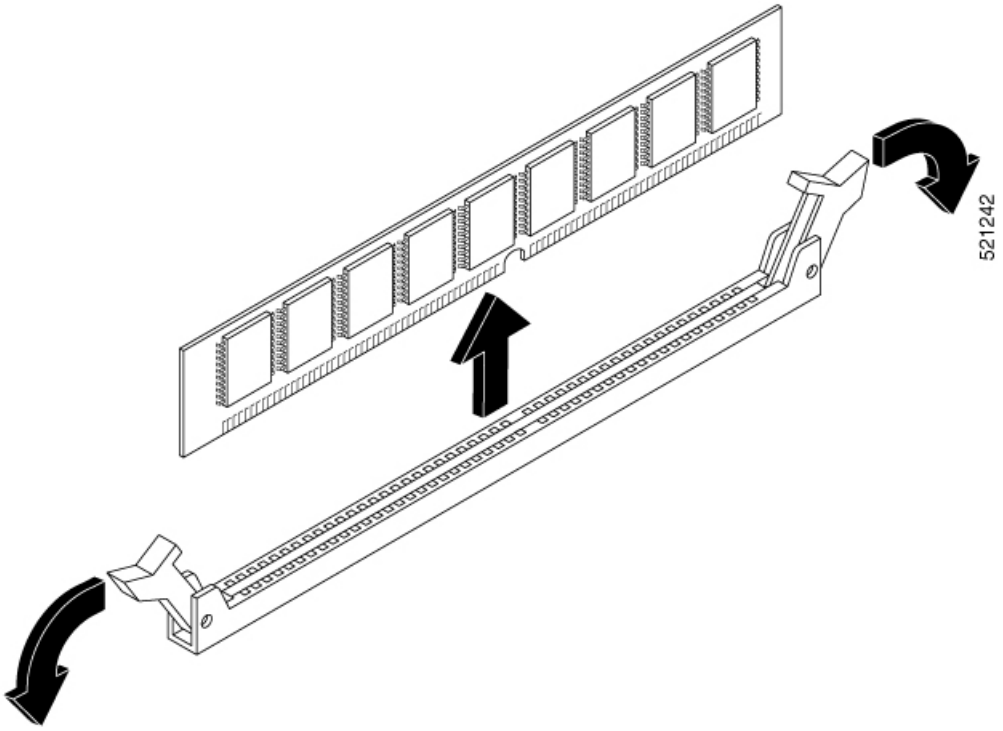
Remove a DIMM

Use these steps to remove a DIMM:

Procedure

1. Read the Safety Warnings section and disconnect the power supply before you perform any module replacement.
2. Remove the chassis cover. See the *Remove the Chassis Cover* section
3. Locate the DIMM module to find the DIMM sockets on the chassis.
4. Rotate DIMM connector handles downwards to extract the DIMM module.

Figure 33: Remove a DIMM



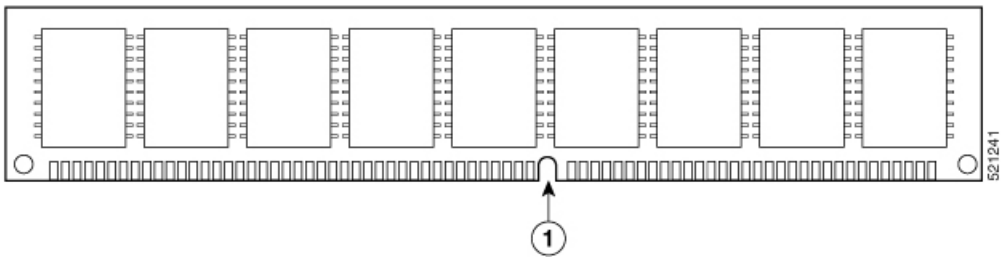
Install a DIMM

Follow these steps to install a DIMM on the Cisco 8400 Series Secure Routers.

Procedure

1. Read the *Safety Warnings* section and disconnect the power supply before you perform any DIMM replacement.
2. Remove the chassis cover.
3. Locate the DIMM module to find the DIMM sockets on the device.
4. Ensure that both latches on the DIMM connector are in the open position.
5. Orient the DIMM so that the polarization notch lines up with the polarization key on the connector.
6. Insert the DIMM into the connector one side at a time.
7. Rotate the connector handles upward and click into place.

Figure 34: DIMM showing polarization notch

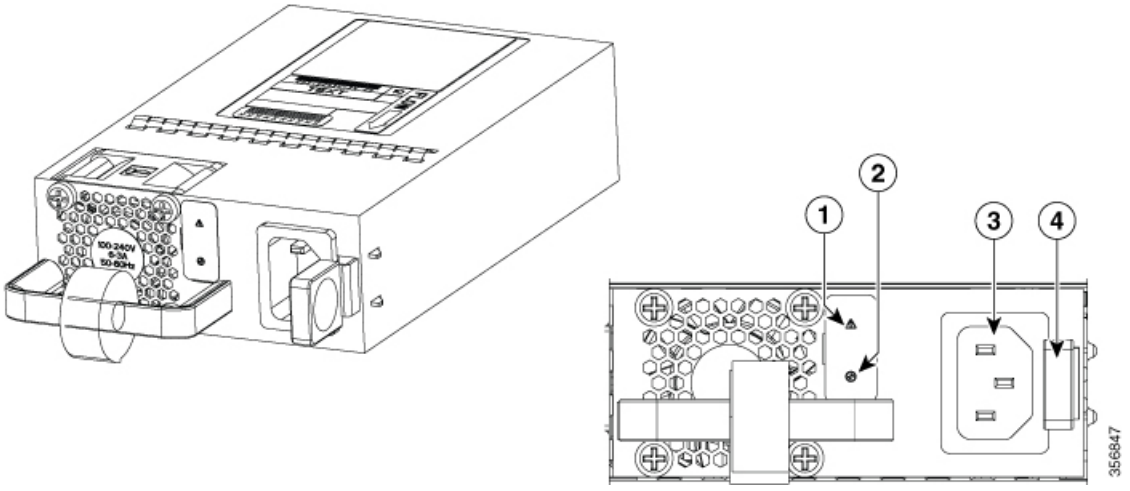


8. Replace the chassis cover.

AC power supply

Explains AC power supply replacement and installation, providing instructions for safely installing, removing, and upgrading AC power supplies in the device.

Figure 35: AC power supply



Number	Description
1	Alarm Fail LED
2	Status LED
3	AC inlet
4	Latch

Install AC power supply

> **Note**
>
> Do not install the power supplies with the chassis cover off.

Procedure

1. Ensure that the chassis power switch on the chassis is in the Standby position.

   > **Note**
   >
   > It is not required to place the chassis power switch in the Standby position if you want to hot-swap a single power supply.

2. Insert the power supply module into the appropriate slot(s), making sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.
3. Insert the power supply cables firmly into the power supplies.

   > **Note**
   >
   > Ensure the power supplies are inserted firmly and the power cords are in place.

4. If you have changed the chassis power switch to the Standby position in Step 1, press the power switch to the On position.

   The power supply LEDs are illuminated (green).

Replace the AC power supply

> **Note**
>
> The device has redundant power supplies that can be hot-swapped.

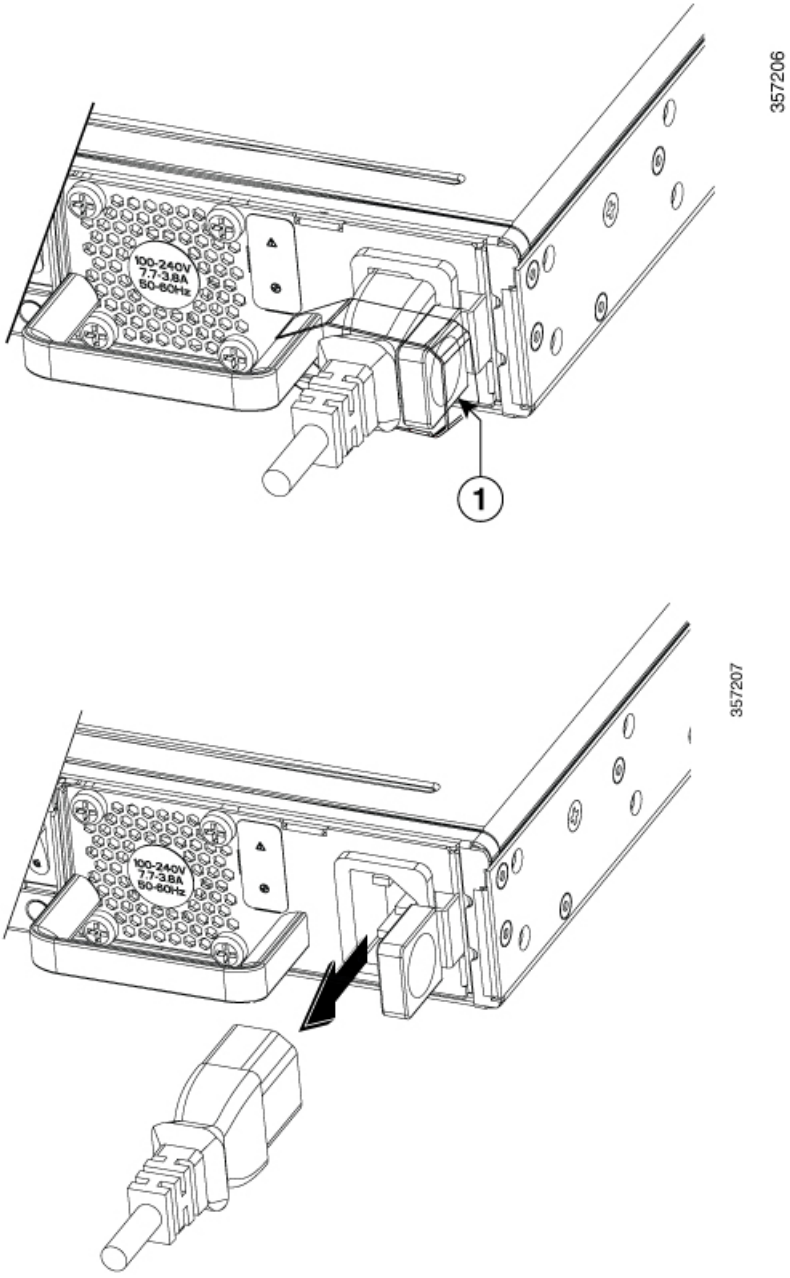
To remove an AC power supply from Cisco 8400 Series Secure Routers, perform these steps:

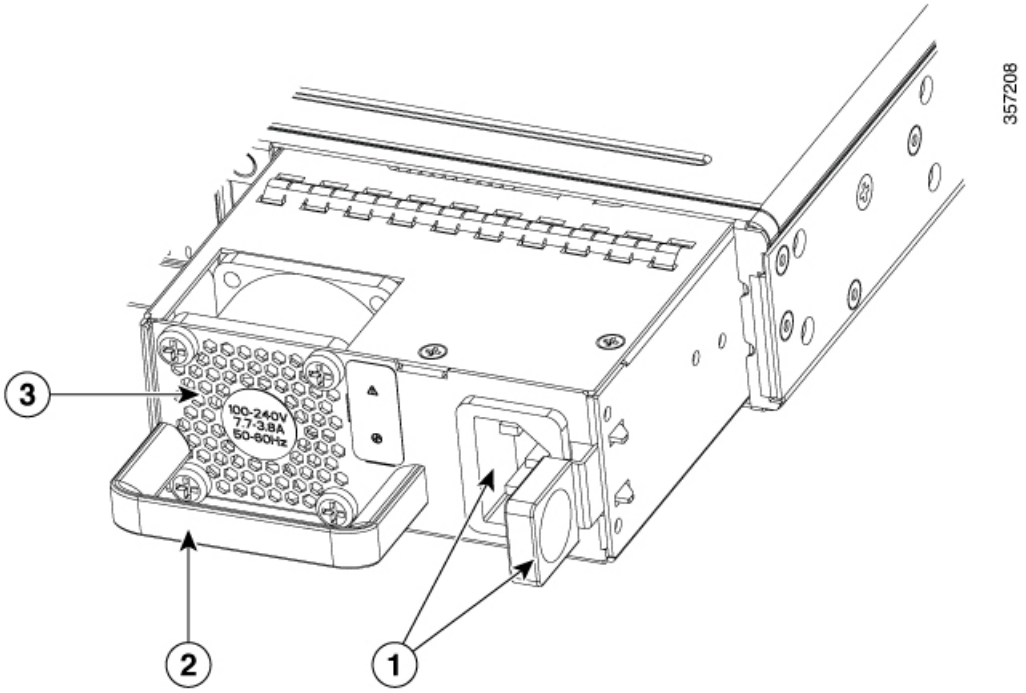
Procedure

1. Read the safety warnings section of this document.

2. The device has redundant power supplies and does not have to be shut down prior to replacing the power supply.
3. If in use, remove the strain relief securing the power supply cable to the power supply latch.
4. Remove the power cord from the power socket.
5. Depress the power supply latch and use the handle to pull the supply out of the router.

Figure 36: Replace the AC power supply





Number	Description
1	Latch and AC inlet
2	Latch
3	AC Power

DC power supply

Outlines procedures for handling DC power supplies, including installation, removal, wiring the DC input power source, and relevant safety considerations to maintain system power integrity.

This section describes how to install the DC power supply input power that leads to the DC input power supply:

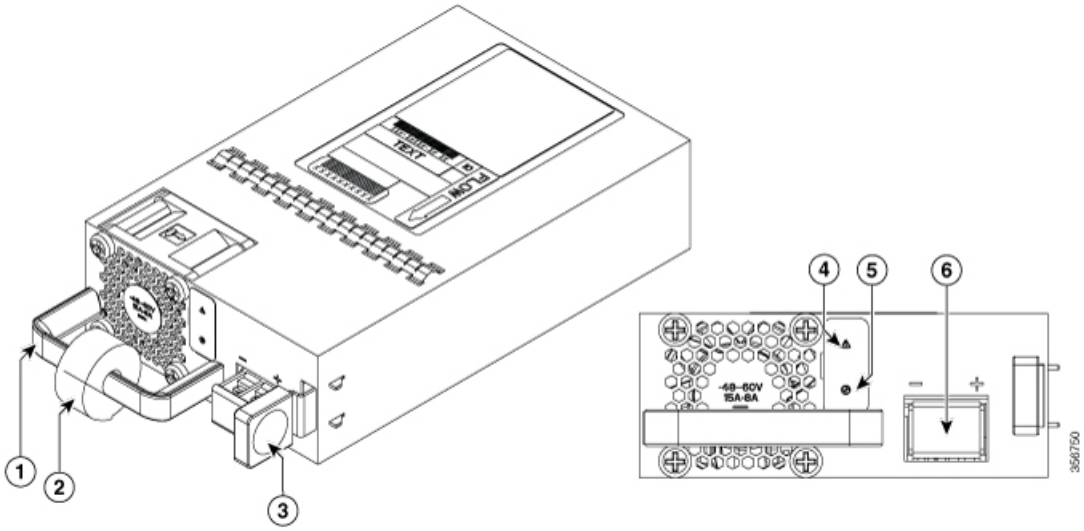
Note

The device has redundant power supplies that can be hot-swapped.

The DC input connector has negative(-) on left and positive(+) on right with mark.

The power supply has a handle to be used for insertion and extraction. The module must be supported with one hand because of its length.

Figure 37: DC power



supply

400W DC

1 Ha 2 Sh

3 La 4 Fa

5 St 6 Te

Install DC power supply

Note

Do not install the power supplies with the chassis cover off.

This section describes how to install the DC power supply input power leads to the DC input power supply. Before you begin, read these important notices:

- The color coding of the DC input power supply leads depends on the color coding of the DC power source at your site. Ensure that the lead color coding you choose for the DC input power supply matches the lead color coding used at the DC power source and verify that the power source is connected to the negative (-) terminal and to the positive (+) terminal on the power supply.
- Ensure that the chassis ground is connected on the chassis before you begin installing the DC power supply. Follow the steps provided in the *Chassis Ground Connection* section.

Each DC input power cable is terminated at the PSU by a cable lug, as shown in the following figure.

Note

DC input power cables must be connected to the PSU terminal studs in the proper positive (+) and negative (-) polarity. In some cases, the DC cable leads are labeled, which is a relatively safe indication of the polarity. However, you must verify the polarity by measuring the voltage between the DC cable leads. When making the measurement, the positive (+) lead and the negative (-) lead must always match the (+) and (-) labels on the power distribution unit.

Note

To avoid hazardous conditions, all components in the area where DC input power is accessible must be properly insulated. Therefore, before installing the DC cable lugs, be sure to insulate the lugs according to the manufacturer's instructions.

Remove and replace the DC power supply

The device has redundant power supplies that can be hot-swapped.

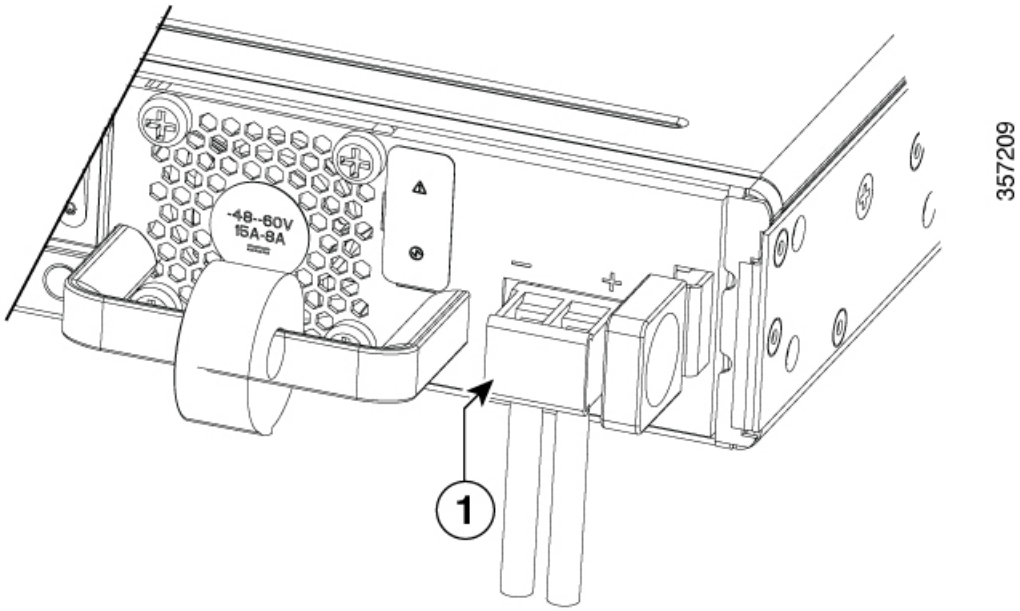
This section describes how to remove a DC power supply from C8400 Series Routers

Follow these steps:

Procedure

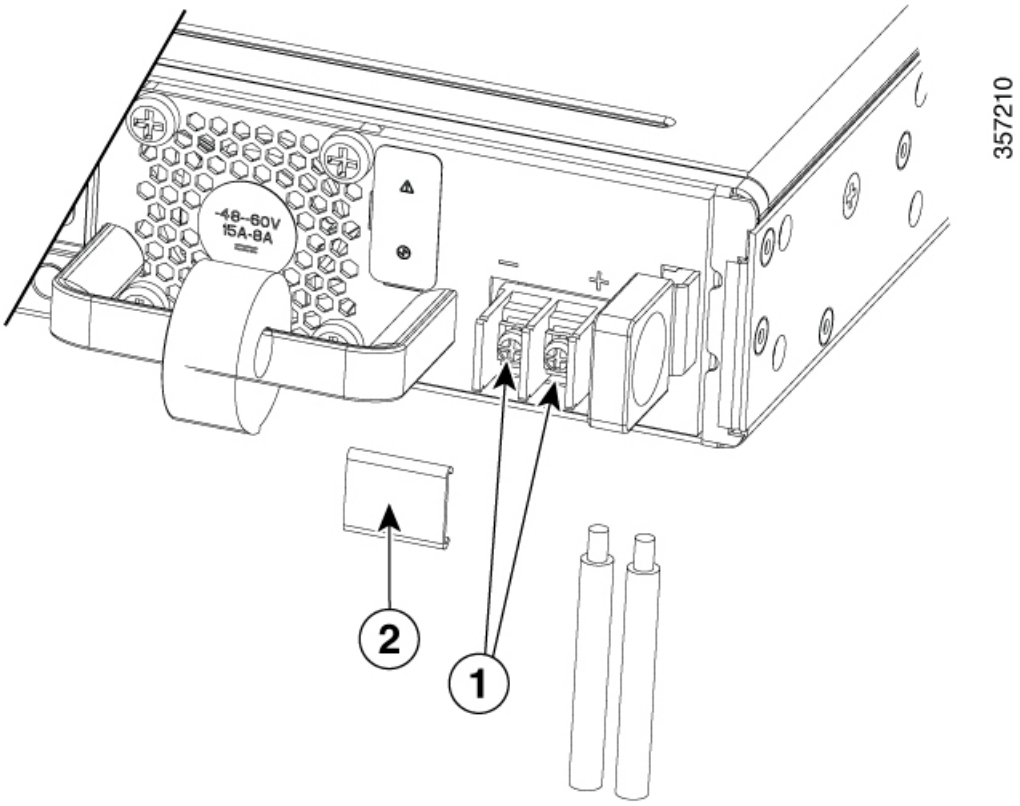
1. Read the safety warnings section of this document.
2. The device has redundant power supplies and does not have to be shut down prior to replacing the power supply. The power supply may be replaced while the device is in service.
3. At the power supply unit or at the local circuit breaker, remove the power from the DC power leads (label **1**) attached to the power supply to be replaced.

   Figure 38: Remove DC power



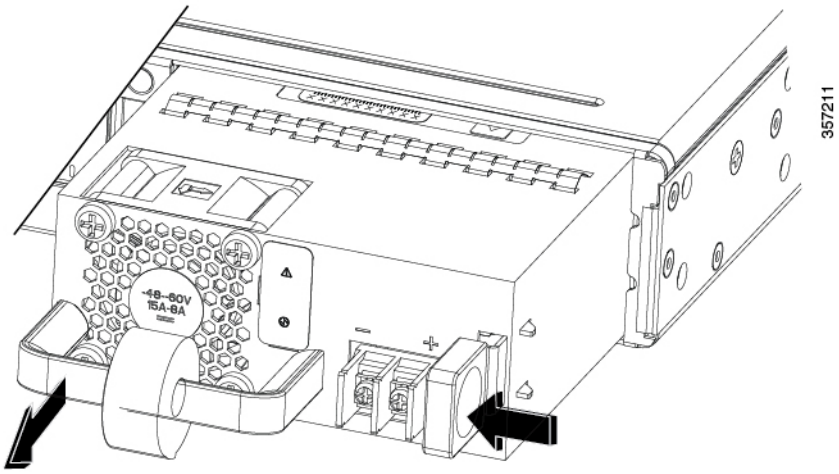
4. Remove the terminal block cover and loosen the terminal screws (label **1**) securing the power cabling. Remove the power cabling from the terminal block.

Figure 39: Remove power cabling



5. Depress the power supply latch and use the handle to pull the supply out of the device.

Figure 40: Pull out power supply



This completes the procedure for removing a DC power supply.

Wire the DC power

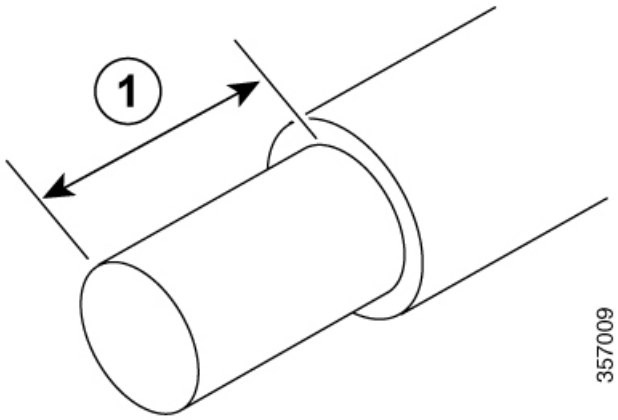
In the Cisco 8400 Series Secure Routers, the DC power supply has a terminal block that is installed into the power supply terminal block header.

Use the following steps to wire the DC input power source:

Procedure

1. Turn off the circuit breaker from the power source to be connected to the power source.
2. Insert the power module in the power-supply slot, and gently push it into the slot.
   - The DC power supply (excluding the extraction handle) is flushed with the device.
3. Wire can be stripped and terminated directly to the power supply terminal block, or a crimp style spade terminal lug can be used. If using a terminal lug follow the manufacturer's instructions for terminating the lug to the wire. If terminating directly to the terminal block using bare wire, following the below directions. Use a wire-stripping tool to strip each of the two wires coming from the DC input power source and strip the wires to approximately 0.39 inch (10 mm) + 0.02 inch (0.5 mm). It it recommended that 14 AWG insulated wire be used. Do not strip more than the recommended length of wire because doing so could leave the wire exposed from the terminal block and shows a stripped DC input power source wire.

   Figure 41: Stripped DC input power source wire



1	0.39 inch (10 mm) is the recommended wire-strip length for the terminal block.

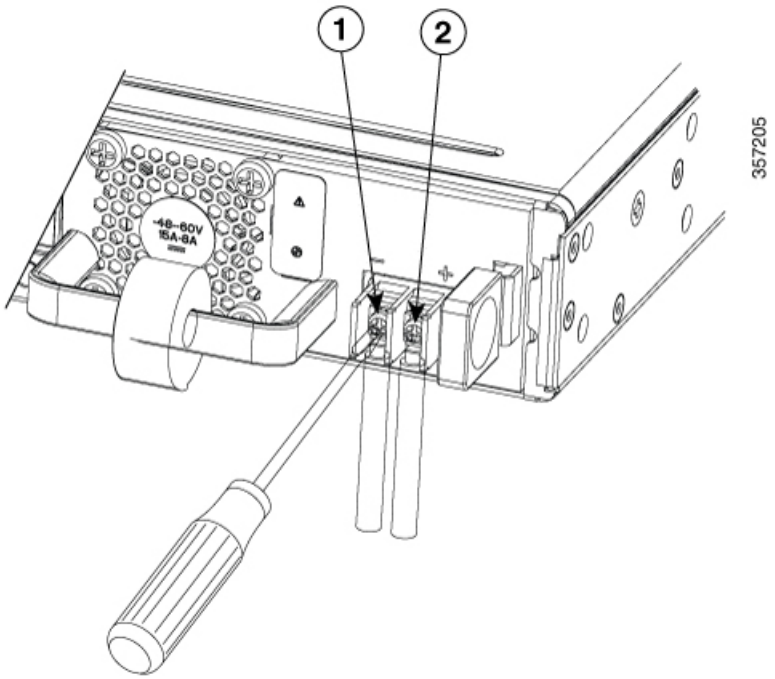
> **Warning**
>
> An exposed wire lead from a DC input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC input power source wire extends from the terminal block. Statement 122

4. Identify the positive and negative feed positions for the terminal block connection.
   a) Positive (+) lead wire (right)
   b) Negative (-) lead wire (left)
5. Remove the terminal block cover.
6. Insert the exposed wire into the terminal block. Ensure that you cannot see any wire lead outside the plastic cover. Only wires with insulation should extend from the terminal block.

> **Caution**
>
> Do not overtorque the terminal block captive screws. Ensure that the connection is snug, but the wire is not crushed. Verify by tugging lightly on each wire to ensure that they do not move.

7. Use a screwdriver to tighten the terminal block captive screws.

Figure 42: DC power supply with lead wires



1 Negative (-) DC input wire
2 Positive (+) DC input wire

8. Repeat these steps for the remaining DC input power source wire as applicable.
9. Use a tie wrap to secure the wires to the rack, so that the wires are not pulled from the terminal block by casual contact.
10. Turn on the circuit breaker at the power source.

Remove and replace the power supplies

Details the process for removing and replacing device power supplies, offering a conceptual overview of proper handling and steps for safe power component swaps.

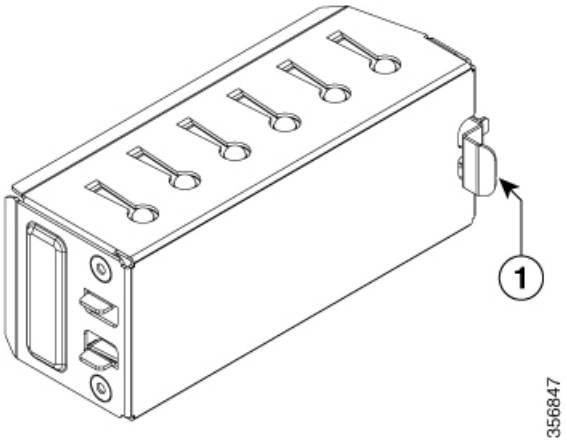
Note

If a PSU which is failed is removed, a PSU-blank must be installed in the slot until a new PSU is installed.

Note

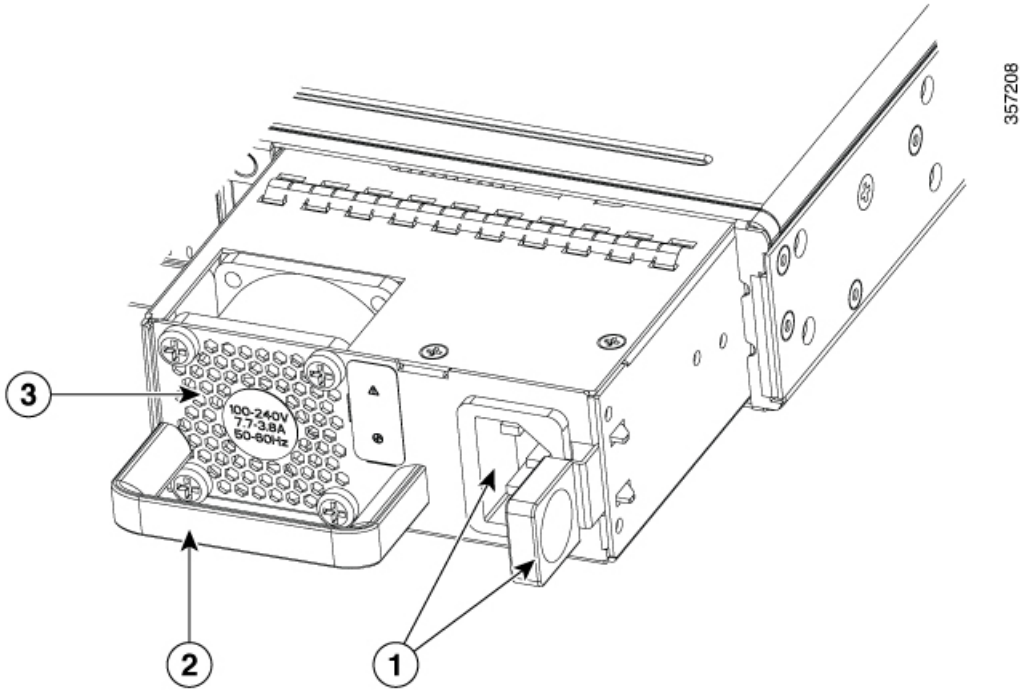
The Cisco 8400 Series Secure Routers support dual hot-swap PSUs.

Figure 43: Power supply blank



Number	Description
1	Latch

Figure 44: Correct orientation of the power supply unit

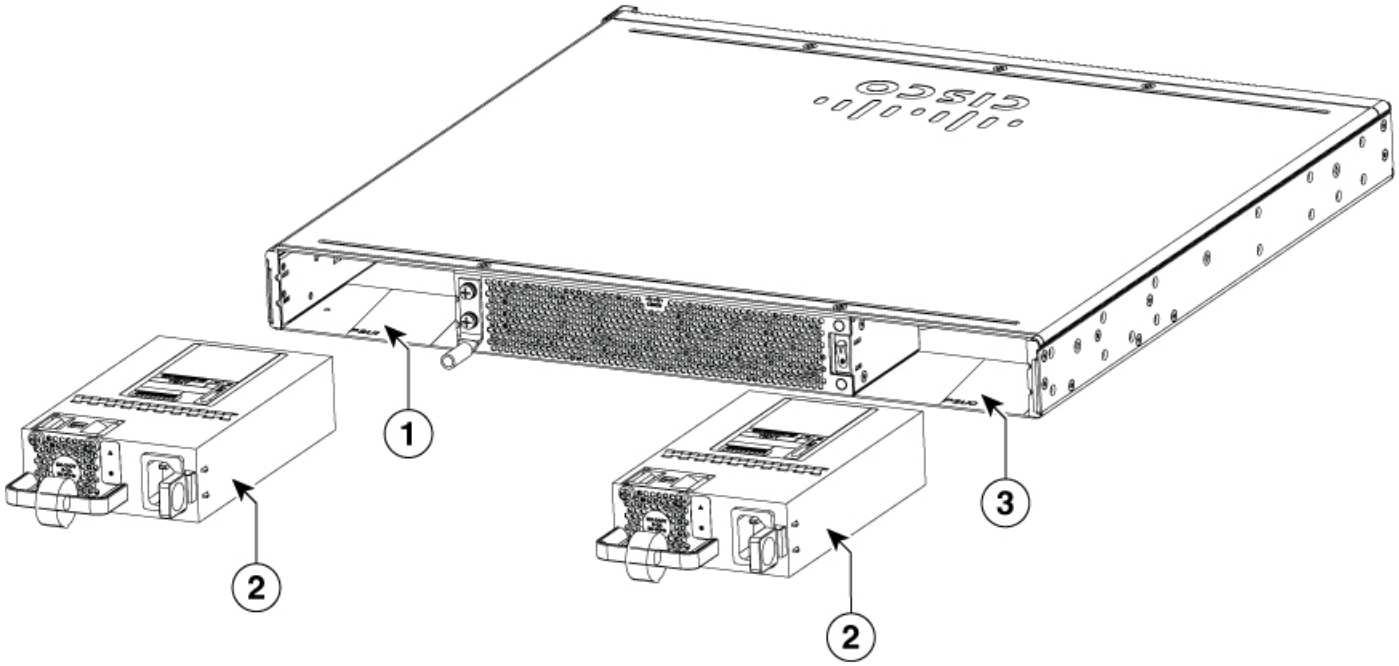


Note

When installing a PSU, ensure the orientation is correct.

1. Latch and power input on right side.
2. Handle on bottom left.
3. Power markings are oriented such that they are readable when viewed straight on.

Figure 45: Power supply unit

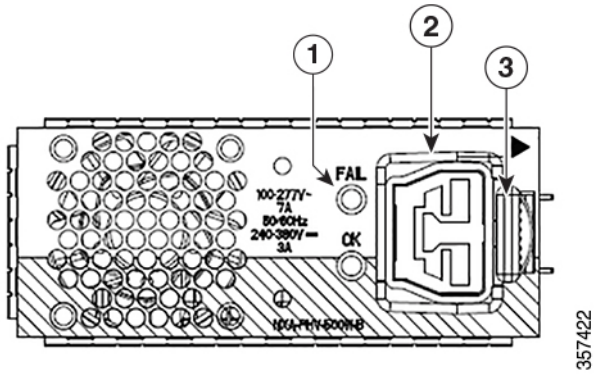


Number	Description
1	PSU Slot 1
2	PSU
3	PSU Slot 0

AC/DC/HVDC power supply

Describes procedures for AC/HVDC power supplies, guiding users through installation and removal methods to support multiple power configurations.

Figure 46: 400W AC power supply



1 2

3

Install AC/HVDC power supply

> **Note**
>
> Do not install the power supplies with the chassis cover off.

Procedure

1. Ensure that the chassis power switch on the chassis is in the Standby position.

   > **Note**
   >
   > It is not required to place the chassis power switch in the Standby position if you want to hot-swap a single power supply.

2. Insert the power supply module into the appropriate slot(s), making sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.
3. Insert the power supply cables firmly into the power supplies.

   > **Note**
   >
   > Ensure that both power supplies are inserted firmly and the power cords are in place.

4. If you have changed the chassis power switch to the Standby position in Step 1, press the power switch to the On position.

   The power supply LEDs are illuminated (green).

Remove AC/HVDC power supply

Procedure

1. Ensure that the chassis power switch is in the Standby position.

   > **Note**
   >
   > It is not required to place the chassis power switch in the Standby position if you want to hot-swap a single power supply.

2. Unplug the power cable from the power supply.

3. Press the retaining latch towards the pull handle, grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand.
4. Repeat these steps if it is required to remove the other AC/HVDC power supply.

Fan tray

Explains fan tray replacement, detailing the process and precautions necessary to maintain system cooling and ensure reliable operation.

In the Cisco 8400 Series Secure Routers, there is a field replaceable unit (FRU) fan tray. The fan tray includes all the fans in one assembly. If a fan fails, replace the tray using a #1 Phillips screwdriver.

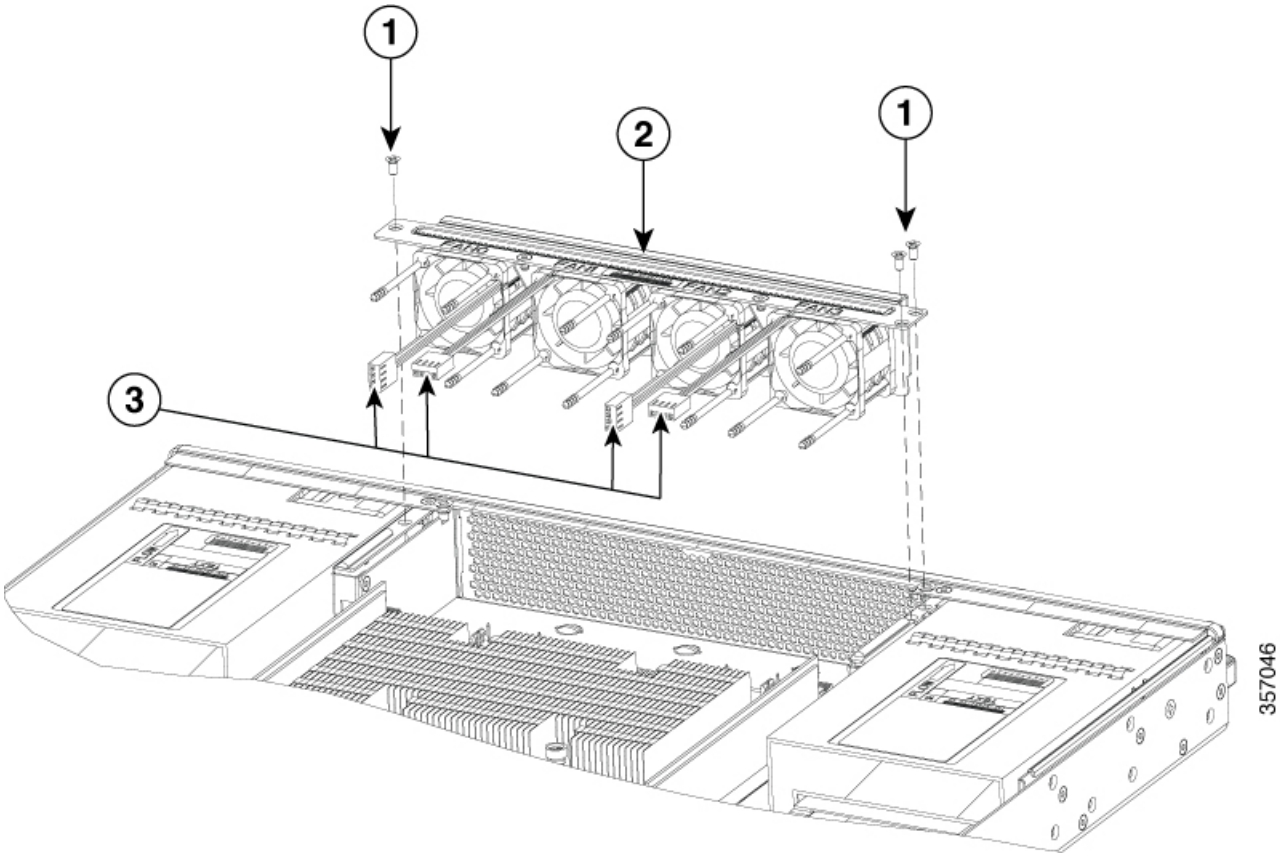
Remove the fan tray

To remove the fan tray, complete the following steps:

Procedure

1. Remove the top cover. See Remove the chassis cover on page 60.
2. Remove the three screws that secure the fan tray to the chassis.
3. Disconnect fan cables from the motherboard.
4. Remove the fan tray.

Figure 47: Fan tray



Number	Description
1	Screws
2	Fan Tray
3	Fan cable connector

Install the fan tray

The Cisco C8400 series routers supports forward air flow (standard version). To install the fan tray, perform the following steps :

Procedure

1. Install the fan tray.
2. Install the three fan tray mounting screws.
3. Connect the fan cables to the motherboard.

> **Note**
>
> The fan number (FAN0, FAN1, FAN2, and FAN3) is marked on the top of the fan tray and the motherboard by its connector. The fan wire should be connectedto its corresponding connector on the motherboard.

4. Install the top cover
5. Re-install the unit back in an equipment rack.
6. Reinstall all cables from the chassis
7. Power on the unit.

SFP modules

Guides users through the handling of SFP and SFP+ modules, addressing laser safety, and providing step-by-step instructions for removing these modules.

Before you begin

See Cisco Optics to Device Compatability Matrixfor a list of supported SFP modules. Use only supported SFP/SFP+/SFP28 modules on the router.

- Do not remove the dust plugs from the SFP modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an SFP module can shorten its useful life. Do not remove and insert any SFP module more often than is necessary.

- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.
- When you insert several SFP modules in multiple ports, wait for 5 seconds between inserting each SFP. This will prevent the ports from going into error disabled mode. Similarly, when you remove an SFP from a port, wait for 5 seconds before reinserting it.

Procedure

1. Attach an ESD-preventive wrist strap to your wrist and to an earth ground surface.
2. Find the send (TX) and receive (RX) markings that identify the top of the SFP module.

   On some SFP/SFP+ modules, the send and receive (TX and RX) markings might be shown by arrows that show the direction of the connection.
3. If the SFP module has a bale-clasp latch, move it to the open, unlocked position.
4. Align the module in front of the slot opening, and push until you feel the connector snap into place.
5. If the module has a bale-clasp latch, close it to lock the SFP module in place.
6. Remove the SFP dust plugs and save.
7. Connect the SFP cables.

Laser safety guidelines

Optical SFPs use a small laser to generate the fiber-optic signal. Keep the optical transmit and receive ports covered whenever a cable is not connected to the port.

Warning

Statement 1255–Laser Compliance Statement

Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019.

Follow these steps to install an SFP module in your router:

Procedure

1. Read the Safety Warnings section and disconnect the power supply before you perform any module replacement.
2. Slide the SFP into the router connector until it locks into position

Tip

If the SFP uses a bale-clasp latch (see Laser Safety Guidelines section, the handle should be on top of the SFP module.

Caution

Do not remove the optical port plugs from the SFP until you are ready to connect cabling.

3. Connect the network cable to the SFP module.

Remove small form-factor pluggable modules

Follow these steps to remove a Small Form-Factor Pluggable (SFP) from the device:

Procedure

1. Read the Safety Warnings section and disconnect the power supply before you perform any module replacement.
2. Disconnect all cables from the SFP.

Caution

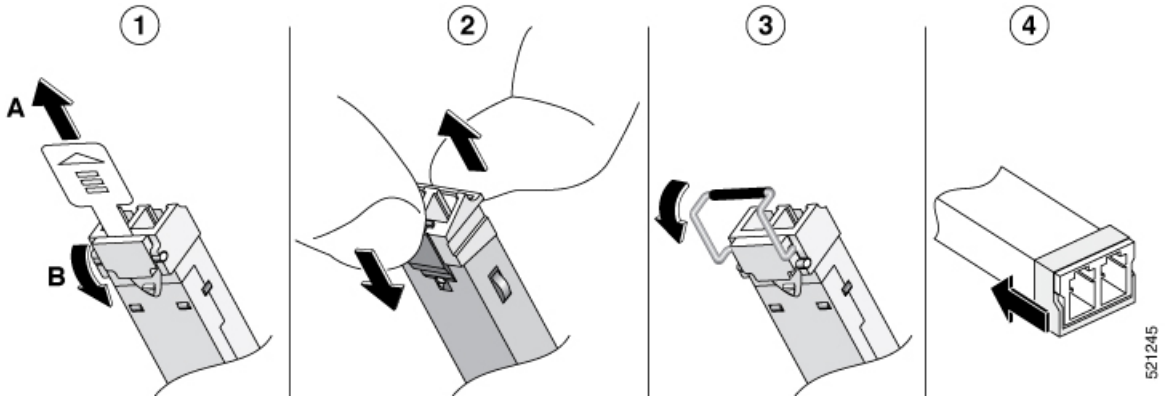
The latching mechanism used on many SFPs locks the SFP into place when cables are connected. Do not pull on the cabling in an attempt to remove the SFP.

3. Disconnect the SFP latch.

Note

SFP modules use various latch designs to secure the module in the SFP port. Latch designs are not linked to SFP model or technology type. For information on the SFP technology type and model, see the label on the side of the SFP.

Figure 48: Disconnecting SFP Latch Mechanisms



Item	Description
1	Bale-clasp handle in closed position
2	Bale-clasp handle in open position
3	Flipped bale-clasp handle
4	Bale-clasp handle in closed position

Tip

Use a pen, screwdriver, or other small straight tool to gently release a bale-clasp handle if you cannot reach it with your fingers.

4. Grasp the SFP on both sides and remove it from the device.

M.2 storage device

Describes precautions against electrostatic discharge and provides procedures for installing and removing an M.2 storage device to ensure safe storage upgrades and maintenance.

This section describes how to install and replace an an M.2 module on the Cisco 8400 Series Secure Routers.

Prevent electrostatic discharge damage

The M.2 module is sensitive to electrostatic discharge (ESD) damage, which can occur when electronic cards or components are handled improperly. ESD results in complete or intermittent failures.

To prevent ESD damage, follow these guidelines:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.

- Connect the equipment end of the strap to an unfinished chassis surface.
- Place the M.2 storage devices on an anti-static surface or in a static shielding bag. If you have to return the device to the factory, immediately place it in a static shielding bag.
- Avoid contact between the device and clothing. The wrist strap protects the device from ESD voltages on the body only; ESD voltages on clothing can still cause damage.
- Do not remove the wrist strap until the installation is complete.

> **Caution**
>
> For safety, periodically check the resistance value of the anti static strap. The measurement should be between 1 and 10 megohms (Mohms).

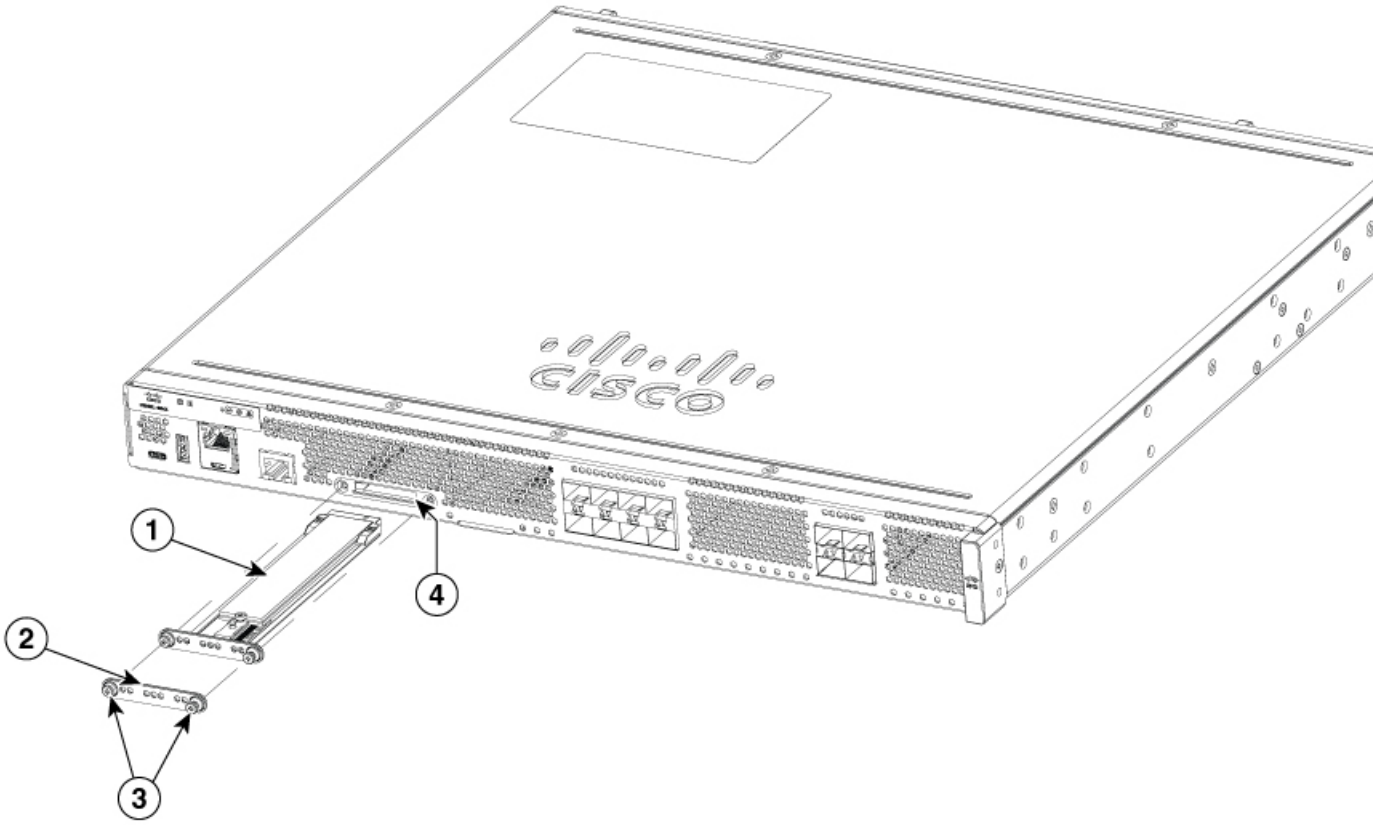
Remove and replace the M.2 storage device

To remove and install a M.2 storage device, perform the following steps:

Procedure

1. Disconnect the power supply to the Cisco 8400 Series Secure Routers before you perform any module replacement.
2. Loosen the two mounting screws using a #1 Phillips screwdriver and then remove the M.2 module or blank.
3. Install the M.2 memory module into the slot.

Figure 49: Remove the M.2 storage device



Item	Description
1	M2 Mo
2	M2 Bla
3	Mo Sc
4	Cis Gu (ey to po ide of M2 wh ins ca

> **Note**
>
> When the M.2 module is not installed, install a blank in the slot.

4. Secure the 2 mounting screws using a #1 Phillips screwdriver. Torque to 4-6 in-lbs.

Remove and replace the battery

Details proper handling, removal, and replacement procedures for batteries, emphasizing safety considerations and compliant disposal of battery units from C8455-G2 and C8475-G2 routers.

These instructions are provided in order to comply with the EU Battery Replaceability Requirement.

- This product was not specifically designed for battery replacement in the field.
- It is recommended that, whenever possible, follow the standard repair or return process for battery issues.

Caution

Always wear an ESD-preventive wrist strap and ensure that it makes good contact with your skin when you remove or install the internal modules. Connect the equipment end of the wrist strap to the metal part of the chassis.

Remove the battery

This task provides instruction on safely removing the battery from the chassis.

Perform this procedure when the battery requires replacement or maintenance on supported hardware.

Note

Follow proper electrostatic discharge (ESD) precautions before handling the battery or device.

Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.

Warning

Statement 1015–Battery Handling

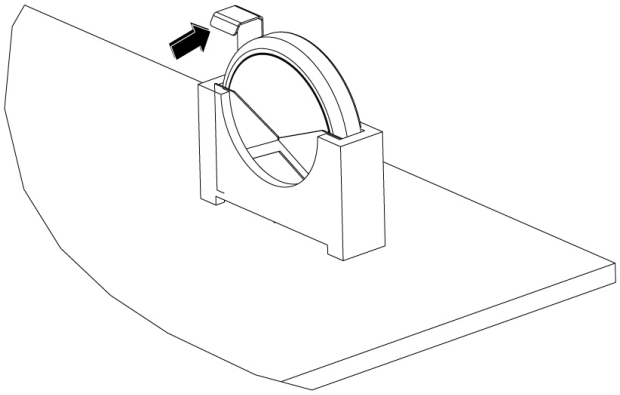
To reduce risk of fire, explosion or leakage of flammable liquid or gas:

- Replace the battery only with the same or equivalent type recommended by the manufacturer.
- Do not dismantle, crush, puncture, use sharp tool to remove, short external contacts, or dispose of in fire.
- Do not use if battery is warped or swollen.

Procedure

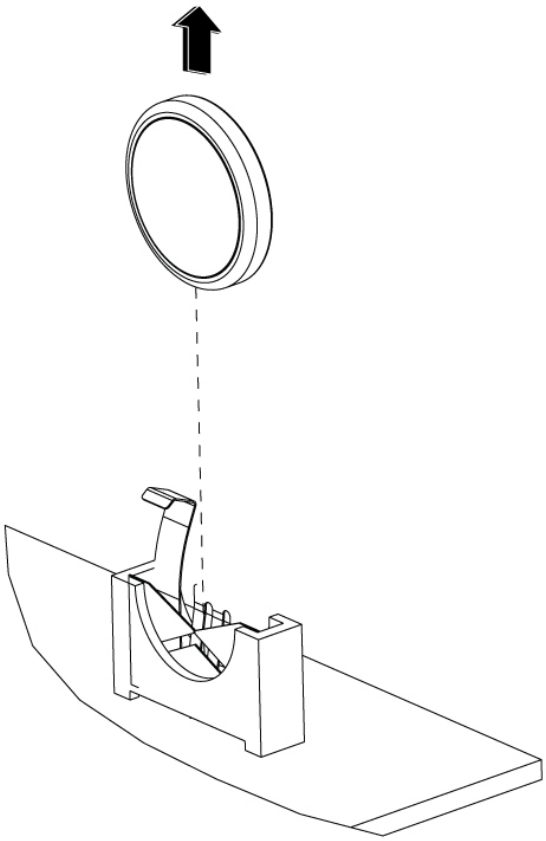
1. Before you perform any module replacement, read the Safety Warnings section and disconnect the power supplies.
2. Identify the type of battery holder and follow the instructions accordingly.
3. For Battery Holder type 1, follow these instructions to remove the battery:
   a) Pull the retention arm back from the battery.

   Figure 50: Pull back the latch arm



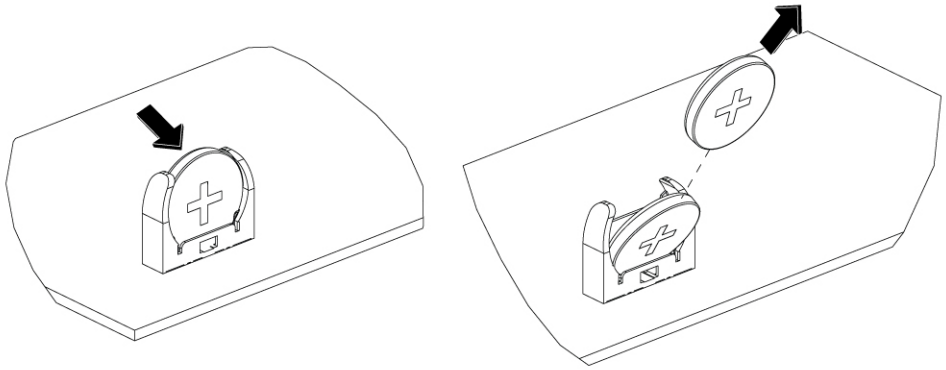
b) Lift the battery out of the holder.

Figure 51: Remove the battery



4. For Battery Holder type 2, follow these instructions to remove the battery:
   a) Pivot the battery in the direction shown.
   b) Pull the battery out at an angle.

Figure 52: Remove the battery



Replace the battery

Provides instruction on safely replacing the battery from the chassis.

Replace the battery in the chassis following the safety procedures to ensure proper device functionality.

> **Note**
>
> Follow proper electrostatic discharge (ESD) precautions before handling the battery or device.

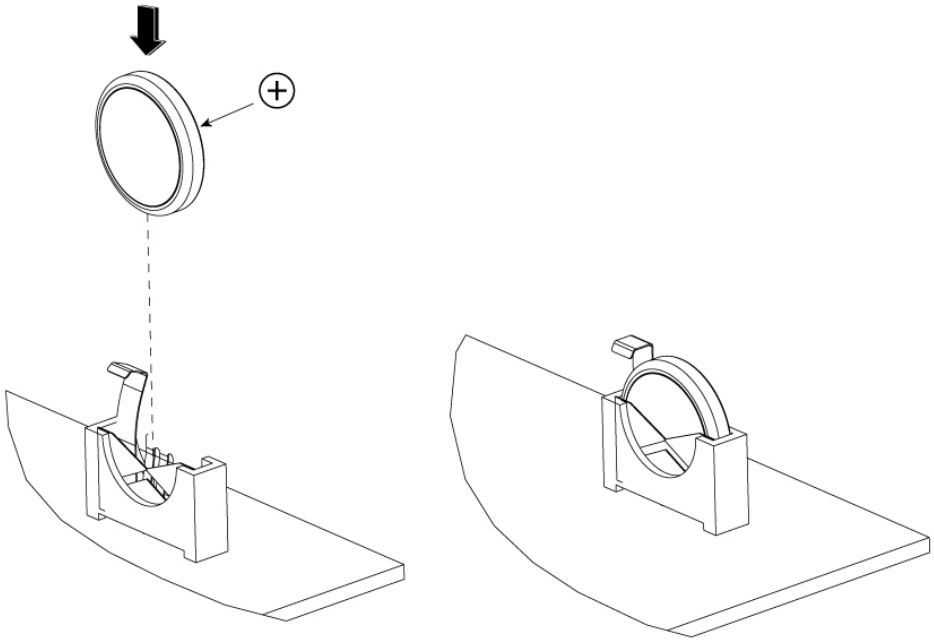
Before you begin

- There are two types of battery holders that may be present on the PCBA. Identify the correct type and refer to the instructions specific to that type.
- The battery is a CR2032 type. Batteries should only be replaced with the same or an equivalent type recommended by the manufacturer.
  - RENATA; 100272
  - VARTA MICROBATTERY INC; 06032 101 501

Procedure

1. Read the Safety Warnings instructions and disconnect the power supplies before you perform any module replacement.
2. Identify the type of battery holder and follow the instructions accordingly.
3. For Battery Holder type 1, follow these instructions to replace the battery:
   a) Orient the battery with positive polarity as shown.
   b) Push the battery down into the holder. Once installed, the latch will snap back over the battery to secure it in place.

   Figure 53: Install the battery



4. For Battery Holder type 2, follow these instructions to replace the battery:
   a) Orient the battery with positive polarity as shown.
   b) Angle the battery so you can insert the edge of the battery into the holder base.
   c) Rotate the battery and press into the base in the same motion to install the battery firmly in the holder.

Figure 54: Install the battery

